Modern Metals

SEPTEMBER, 1961

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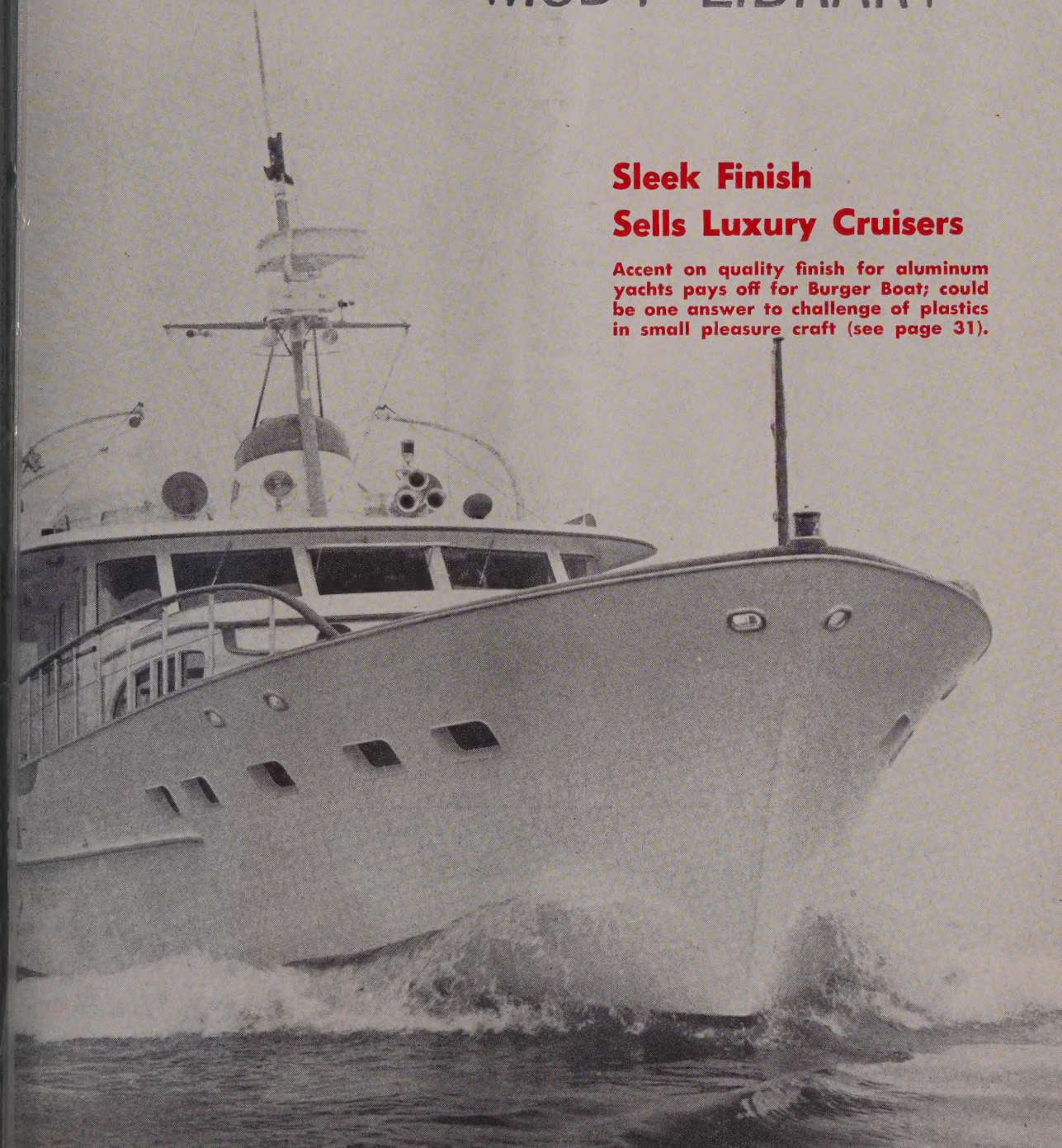

Sleek Finish Sells Luxury Cruisers

Accent on quality finish for aluminum yachts pays off for Burger Boat; could be one answer to challenge of plastics in small pleasure craft (see page 31).

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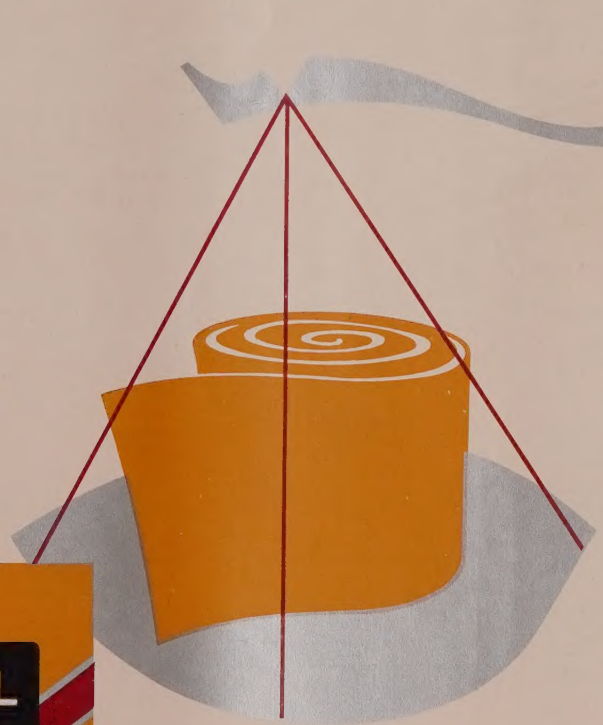

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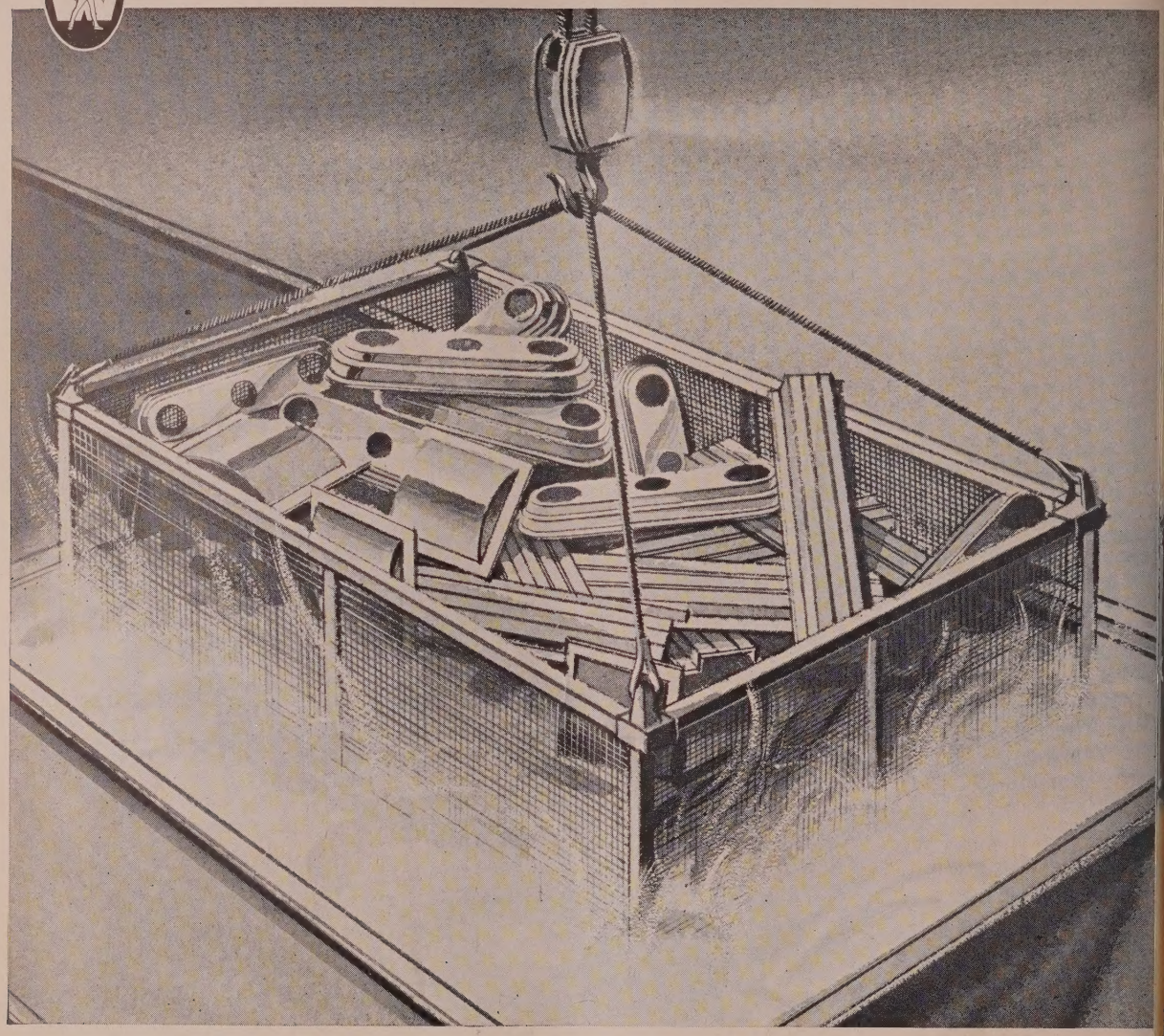

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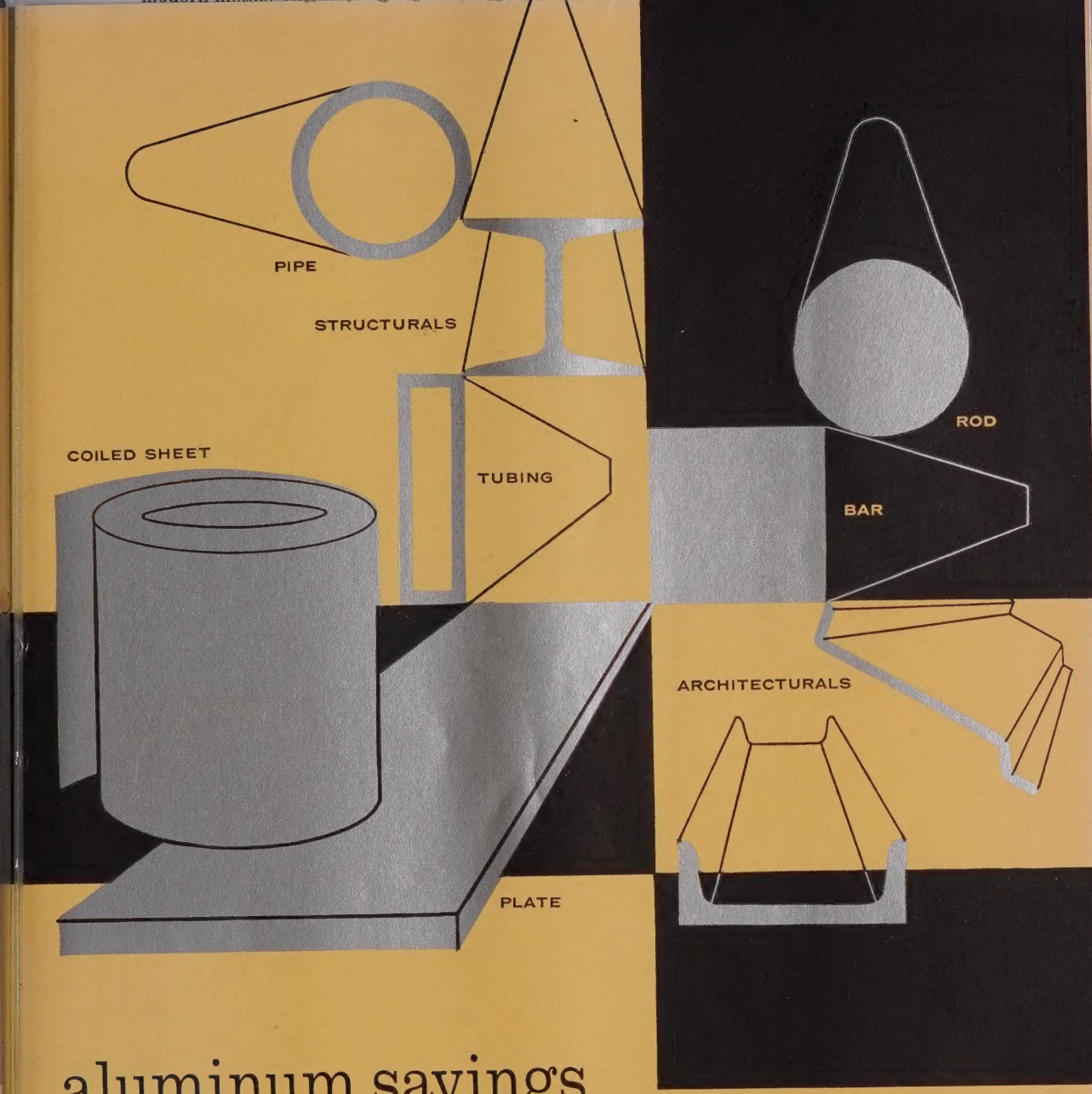

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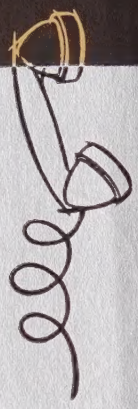

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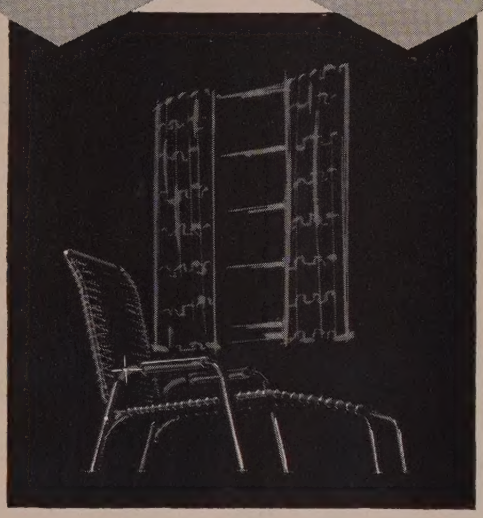

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Read in companies that produce, fabricate and cast aluminum, magnesium and titanium, and firms that use these metals in manufacturing end products.

THE COVER: Burger Boat Co., nitowoc, Wis., has carved its own comfort- niche in the luxury yacht field by es- ishing itself as the premier builder of omized pleasure cruisers from standard ls. Buyers of these boats, which carry e tags running into the hundreds of usands of dollars, make many demands n the builder, not the least of which flawless finish. How Burger achieves finish is detailed in the story which ins on page 31.

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The die has been cut and is in the die inventory of an extruder and would be available for extrusion production.

This design has not been entered in any competition. It should be of particular interest to any large aluminum window producer having promotional talent. Also it should be of interest to promoters of unit ventilators when inquiries may be received for a more attractive type of exterior air intake device . . .

"H"—Md.

MM—Sounds like an ingenious design. Any aluminum window maker interested? We'll forward replies.

Trouble With Streaks In Polished Bronze

Sirs:

We design and fabricate a line of contemporary church furnishings and altar accessories. Since bronze and brass are standard liturgical metals, we find that we are specifying or working with this material a great deal. We would like to ask if you could help us in any way in developing a technique of putting a sunray or sanded finish on this material.

We have in the past been sanding or using a light emery finish on all of our pieces. We have found that after a short period of time, oil streaks or marks appear through the finished piece. These streaks or discoloration often appear after the piece has been lacquered. Have you any recommendations or could you recommend someone who we could contact who could help us with finishing problems?

"R"—Ill.

MM—Sounds as though you are getting some grease-base polishing compound into the sanded finish. Try using a greaseless compound—or degrease the work after finishing.

Anybody else got an idea as to what causes the streaking?

Aluminum Tube: Welded vs. Drawn

Sirs:

We have been subscribers to Modern Metals for quite some time now, and always find your comments extremely interesting and valuable in trying to assess the future.

I was particularly interested in your July

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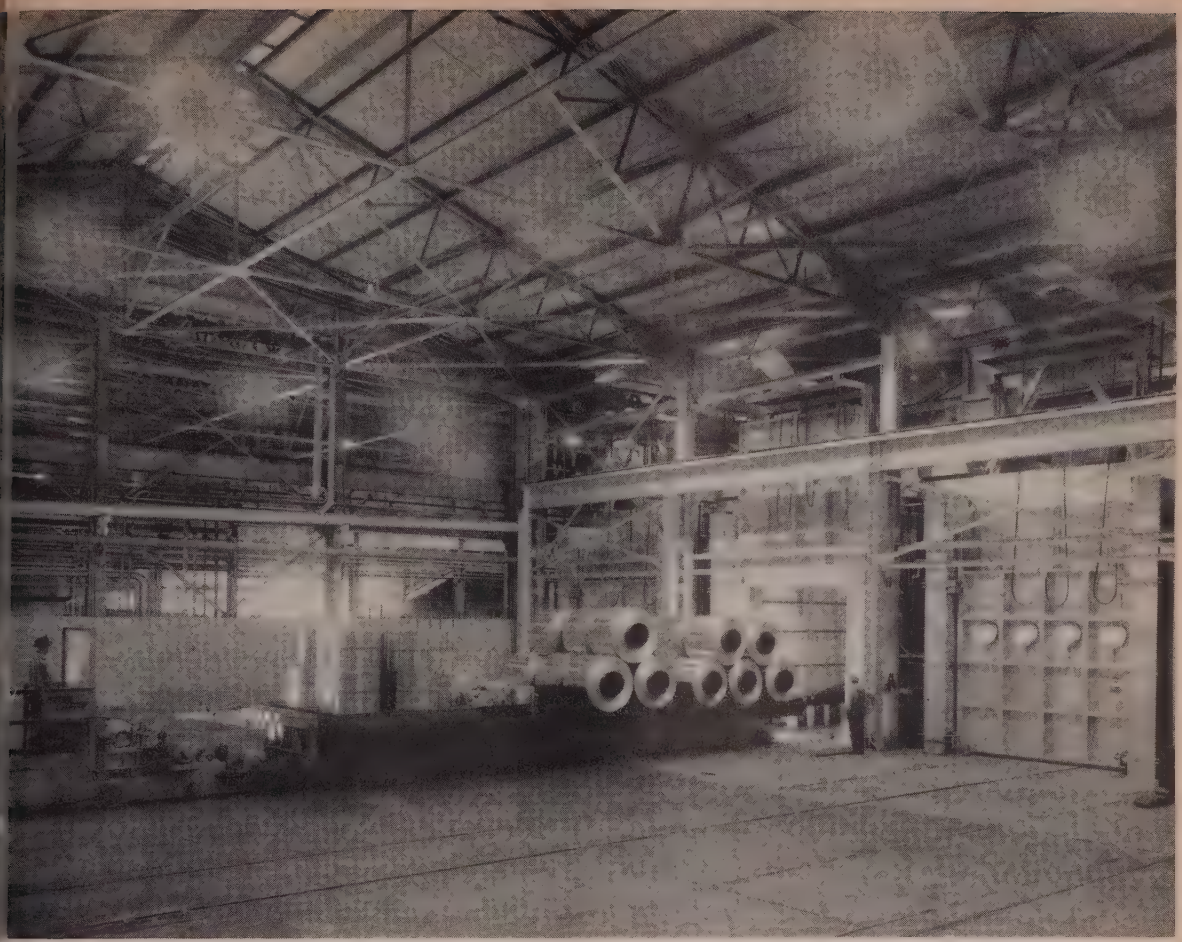

Three of ten Sunbeam aluminum coil annealing furnaces installed at Reynolds Metals Company, Alloys Plant, Listerhill, Alabama

Reynolds expands aluminum capacity with 10 new Sunbeam furnaces

ynolds Metals Company recently added ten new Sunbeam aluminum coil annealing furnaces to meet the owing demand for Reynolds' aluminum. Installed at their Listerhill, Alabama Alloys Plant, the atmosphere ntrolled equipment represents a major part of the plant's multi-million dollar expansion program. The naces are designed to operate from 300°F. to 1000°F., annealing up to 225,000 pounds of aluminum per load.

The furnaces incorporate gas fired radiant tubes divided into appropriate zones of control. Each zone ploys high velocity recirculation capable of air speeds up to 60 miles per hour. Corrugated baffle walls otect the heating chamber and work from direct radiation. This accurate combustion system combined th other design features assures positive control of the annealing process throughout the heating cycle.

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issue to see the article in "Looking Ahead," in which you made very likely suggestions as to what was going to happen in the U.S.A. on the question of prices and general demand. I noticed the absence of any particular reference to aluminum tubing, whose consumption represents quite a percentage of the United Kingdom semis market.

Regarding aluminum tubing in particular, the likely future of welded tube in the States would be of great interest to us. As I see it, from studying graphs which I have made covering the last five years, welded tube represents approximately half the total tube production, and the two follow each other in a very regular seasonal pattern.

In looking through your Metalworking Materials-Equipment-Services Buyers' Guide, you do not differentiate aluminum tubing into drawn tube and welded tube.

I would be most grateful if you could let me have a particular list of who makes welded tube, as opposed to drawn tube, and I would be very interested to have your assessment of the future for both drawn and welded tube in the States, on the lines of your July "Looking Ahead" column. Could you also forward a spare copy of the Buyers' Guide, June edition?

"F"—England

MM—The trend to welded tube is gaining momentum. Back in 1958, welded tube accounted for 23% of the 39,250 tons of aluminum tube shipped. Last year, 30% of the 43,000 tons of tube was welded. In the first half of this year, welded tube accounted for 41% of the 30,454 tons shipped. The bulk of the drawn tube is produced by some 18 firms, while about 10 companies produce nearly all of the welded aluminum tube.

We do not sell our list of aluminum fabricators, but we have sent you a copy of our Buyers' Guide, as you requested. Incidentally, the final 1961 edition of this Directory will be published in our October issue.

Refractories For Aluminum

Sirs:

Your article on "Special Refractories for Aluminum" (August, p. 32) is the most thorough report on this subject I have ever seen. It has already been helpful to us in re-evaluating our melting procedures.

If the report has been reprinted, we would like to have six copies for use throughout our company.

"S"—Mich.

MM—This is one of several similar letters that we have received in the past couple of weeks. The report has been reprinted, and we have sent copies, as requested. We still have a few left.

Who Makes Machines For Tapering Pipe?

Sirs:

We will appreciate your kind advice as to who is the manufacturer of equipment which makes tapered aluminum pipe from straight aluminum pipe.

"T"—Japan

MM—A number of our advertisers who build heavy machinery can supply such equipment. We have sent you a reprint of our Buyers Directory, which lists them.

WANTED
ALUMINUM SIDING MACHINE

Need a portable machine to manufacture on the job site, seamless aluminum siding.

Box 950, Modern Metals
435 N. Michigan Ave.
Chicago 11, Ill.

ANODIZING MAN WANTED

Capable of taking complete charge of large anodizing job shop. Location: East coast. Architectural color included.

Reply to:
Box 711, Modern Metals,
435 North Michigan Ave., Chicago 11, Ill.

Available
EXTRUSION EXPERT

Over 25 years experience in all phases of extrusion, tool designing and plant management.

Box 909, Modern Metals
435 N. Michigan Ave.,
Chicago 11, Ill.

WANT NEW BUSINESS?

Lots of new business from light metals fabricators and product manufacturers is obtained through half-column advertisements like this one.

And the cost is sure low —only $75 per insertion on an annual basis.

Want details? Write Rocky Brown, Modern Metals, Tribune Tower, Chicago 11, DE 7-0638.

FULL-LINE" ECONOMY IN METAL PROCESSING

Chemicals • Equipment • Service

ıen you use Pennsalt metal processing chemicals, ı gain the built-in savings of a complete line that ures you of getting the material exactly suited each job, at the lowest cost.

ver 40 types of cleaners for all metals . . . ull range of etchants and brighteners . . . descaling d pickling compounds . . . Fosbond® phosphate ıtings . . . Foscoat® and Foslube® cold-forming ıricants . . . Drawcote® deep-drawing lubricants . paint strippers . . . strippable vinyl coatings. All ality controlled, readily available . . . because nnsalt makes its own alkalies and other basic ıterials.

The Pennsalt System Approach treats your metal finishing line as an integrated system . . . makes chemicals and equipment work together for high-speed production, product quality, lower costs. Key to this approach is personalized service by Pennsalt's nation-wide organization of trained specialists. Our men analyze your process requirements, design processing lines, aid in installation and start-up. And even more important, they make regular service calls to keep your finishing line running efficiently month after month.

Call or write today for a consultation. And write for free booklet "The Pennsalt Metal Preparation Service Plan."

. . . a better start for your finish®

METAL PROCESSING DEPARTMENT

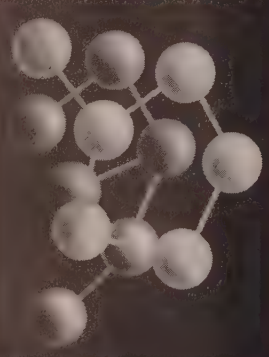
PENNSALT CHEMICALS CORPORATION

East: 3 Penn Center, Philadelphia 2, Pa.
West: 2700 S. Eastern Ave., Los Angeles 22, Calif.

Pennsalt® Chemicals

Pennsalt Chemicals of Canada Ltd., Oakville, Ontario • Industrial Química Pennsalt, Mexico City

WHEN DIMENSIONAL STABILITY OF CASTINGS IS CRITICAL . . . SPECIFY ALMAG 35



STABILIZATION AT 700 F. PROVIDES ABSOLUTE STRESS RELIEF AND DIMENSIONAL STABILITY WITHOUT LOSS OF PROPERTIES OR MACHINEABILITY.

Dimensional instability in aluminum alloys results from permanent growth or heating and locked up stresses. Aluminum silicon alloys may be degrowthed by heating to 450° F. and complete stress relief is obtained by heating to 700-800° F. However, most aluminum alloys subjected to that treatment become soft, have low physical properties, and are not machineable.

In contrast with age hardened alloys, Almag 35 is an aluminum-magnesium casting alloy which immediately as cast has full high strength and high shock resistance, retaining these properties for the life of the casting. Because of its composition, it is not subject to growth on heating . . . and when heated to 700-800° F. for five hours and cooled in still air becomes dimensionally stable and at the same time retains its full hardness, physical properties and machineability.

Therefore, Almag 35 is the ideal alloy for casting components of instruments, computing devices, and other equipment where dimensional stability is of prime importance.

WRITE TODAY FOR FREE BULLETIN

WILLIAM F. JOBBINS INCORPORATED

P. O. BOX 230C
AURORA, ILLINOIS

DISTRIBUTED IN CANADA BY ALUMINUM COMPANY OF CANADA, LTD.

Here and There

The Defense Build-Up « « There's a new lo to military procurement, or rather, the "old loo might be said to be back, following the President's d cision to put the nation on a firmer defense footing the face of Mr. K's bellicose attitude on Berlin. D fense Secretary McNamara spelled it out when he inc cated that about $1.8 billion will be spent for no nuclear weapons, ammunition and equipment. All e cept some $120 million is earmarked for materiel th will call in some degree on light metals — from he copters and other types of aircraft to all types of fie communications equipment; from electronic apparat to many types of vehicles — combat and support; fro portable housing to combat engineering gear. It wou be impossible to imagine a more unhappy way to gi industry a shot in the arm, but no decision of an Ame can president has ever been more vital to the natio safety.

Glass Screen Cloth "Chewed Out" « « B worms, agricultural pests that weave cocoons in folia and attack orchards and other crops, seem to have c covered fiberglass. The worms were caught after havi chewed through four layers of a bolt of glass cloth Fibercoat Corp., 7040 N.W. 35th Ave. in Miami. I they didn't digest the material because it's inorga and has no nourishment, according to Louis Dai assistant agricultural agent for Dade County. Dai said the six-legged, black and white critters used fiberglass to build the cocoons, six of which were fou woven on the cloth. "They don't have teeth," Dail said, "but their multiple mouth parts are strong designed for hard, horizontal chewing." Usually, said, bagworms are satisfied to use sticks and leaf fr ments to make their cocoons, which they hold toget by spinning silk threads. Another good, if slightly orthodox, reason for using aluminum screen cloth.

Pushing Extrusions « « Extruders and extru die makers have been invited to enter the competi established by The Aluminum Association for the designs in aluminum extrusions. Created to call attention of manufacturers in many fields to the sign versatility offered by the extrusion process, Awards Committee has established two categorie which entries can compete. There will be an award the most ingenious extrusion, another for the ingenious finished part made from an extrusion. most ingenious extrusion will be so judged by re of its originality, the difficulties involved in its ception, and its total accomplishment. Market po tial and esthetic value will be additional criteri judging the winner of the second category. Septe 29 is the deadline for any extruder in the U. S. to nominations among its own or its customers' perso and is eligible itself for a companion trophy i nominee wins. The die shop, if other than the ex er's own, and if a substantial contributor to the su of the extrusion, is also eligible for a companion phy. Winners will be announced and trophies pre

G.E.I. EXTRUDED ALUMINUM SHAPES

ADD BEAUTY . . . UTILITY TO FAMOUS PRODUCTS MANUFACTURED BY

Youngstown Kitchens

Five functional and decorative extruded aluminum parts used in the manufacture of Youngstown Kitchens' Jet-Tower Dishwashers and LO-Line Continuous Counter Tops are produced by General Extrusions, Inc. Needless to say, the most rigid quality requirements are in force.

G.E.I. is geared to accomplish special things in design, close tolerances and quality, rapid production and delivery—most of the time at REGULAR SOLID SHAPE PRICE. G.E.I. engineers are constantly searching for new standards and improvements, new ways to save the customer time, material and money.

GENERAL EXTRUSIONS, INC.

4040 Lake Park Rd. Youngstown, Ohio

SALES OFFICES AT ST. LOUIS, CHICAGO. CINCINNATI, PITTSBURGH, GRAND RAPIDS, CHATTANOOGA, AND CLEVELAND

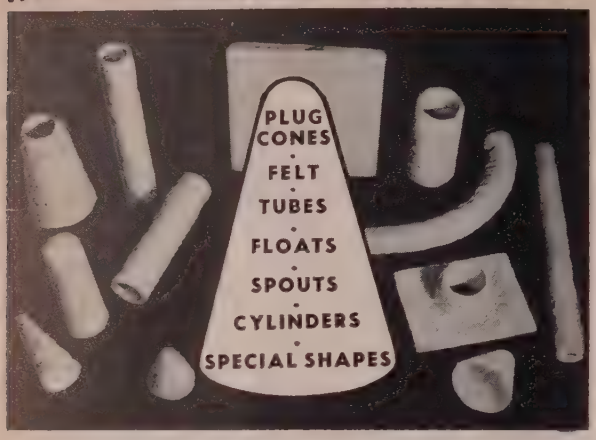
Consult your classified phone book under Aluminum Products.

GLIDE FOR KITCHEN UNIT DRAWERS
LOWER TUB RAIL FOR DISHWASHER
BASKET RAIL FOR DISHWASHER
UPPER TUB RAIL FOR DISHWASHER
HIGHLY FINISHED BORDER BETWEEN SINK UNIT AND WALL FOR LO-LINE CONTINUOUS COUNTER

Youngstown Kitchens' Jet-Tower Dishwasher is expertly engineered and manufactured with three G.E.I. shapes. The upper tub rails, lower tub rails and basket rails are from G.E.I. Before these shapes could be produced, all consideration had to be given to the fact that these extrusions would be subjected to extreme temperatures, detergents and wear and tear of rollers. G.E.I. came up with highly anodized, completely fabricated and durable shapes to help make Youngstown Kitchens' Jet-Tower Dishwasher a top quality product.

Youngstown Kitchens' new Woodcharm line employs a G.E.I. extrusion as the border between continuous counter and wall. Elegantly anodized, the G.E.I. shape blends in with decorative schemes and acts as buffer between sink unit and wall—resisting food splashes, detergents, etc. Drawers smoothly glide on an aluminum extrusion from G.E.I. Tappan range at far right also uses G.E.I. shapes for beauty and utility purposes.

WRP®-X INSULATING REFRACTORY . . .



★ Sealing cones to fit Tap Hole Plugs in aluminum melting furnaces — resilient — labor saving — economical — give a positive seal — cleaner melting. WRP®-X products not wet by molten aluminum withstand in excess of 2300° F.

"K" Factor at 1500° F — 1.1
"K" Factor at 2000° F — 1.4

• *SEND FOR NEW BROCHURE*

REFRACTORY PRODUCTS CO.

910 CUSTER AVENUE (GReenleaf 5-8938) EVANSTON, ILLINOIS

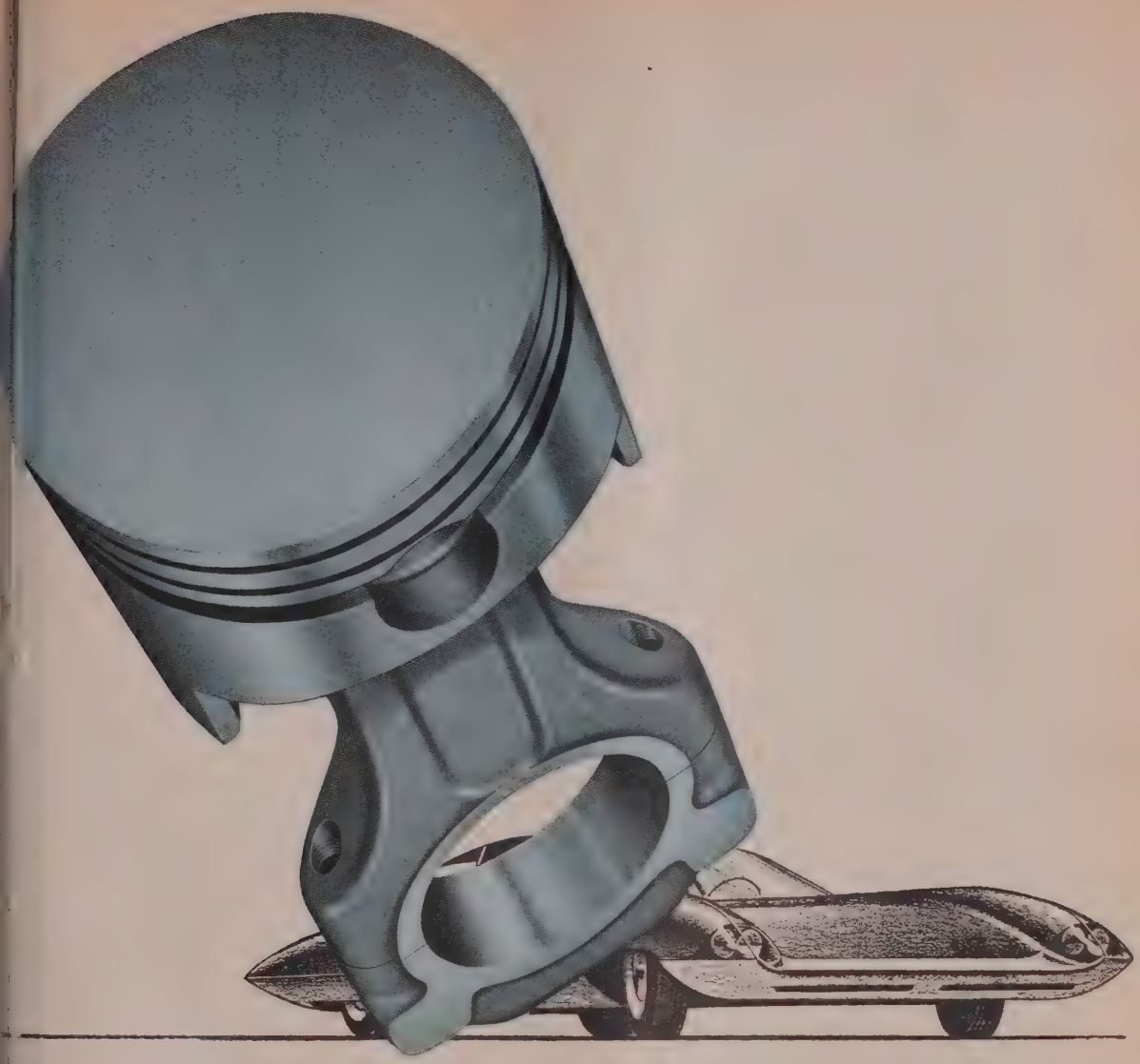
too small to advertise ?

Not at all. Many small firms are getting new business with ads of *this* size. It will cost you only $120 per month (on annual basis) and we will make up a *selling* ad for you. For full details, write to Rocky Brown at Modern Metals, 435 N. Michigan Ave., Chicago 11.

ed on October 27, at the Association's annual autum meeting in New York. Details and conditions of th competition and entry forms may be obtained from th Awards Committee, The Aluminum Association, 42 Lexington Ave., New York 17. "Entries are welcome in all areas of ultimate use; architectural product automotive parts, appliance components, or any of th many fields where aluminum extrusions have bee adopted," said Donald M. White, executive secreta of the Association.

For Budding Architects « « The wheels are turi ing for the 1962 (2nd) Annual Reynolds Aluminu Prize for Architectural Students. People at Reynol Metals Co. who are responsible for the conduct of th worthwhile competition hope that considerably mo contestants will be registered this year than last, whe 32 students from qualified schools in the U. S. submitte designs. Again, prizes of $2500 for the national winn and an equal prize for the winner's school are bei offered. In elimination contests in the various schoo prizes of $200 are given to each winner — in all cas for the "best original design for a building compone in aluminum." The way we see it, there couldn't be more forward-looking program of enlightenment.

Hard Facts About Hardboard « « The alun num home siding people have always had pre-prim hardboard to contend with, but it won't be too lo before they will be competing directly with pre-finish horizontal and vertical hardboard. Report is th Masonite Corp. has test installations of pre-paint horizontal lap siding spotted all over the U.S. Abo a month ago the *Wall Street Journal* carried a sto of Masonite's move toward a vinyl-wrapped and seal hardboard. Indication is that this type of siding being tested also. This new product will be pric competitively with aluminum siding, according to t premature statement of John M. Coates, president Masonite. A hardboard man told us that well o 100,000,000 surface feet of hardboard siding is sold e year, pre-primed, in 5/16, 7/16 and 1/2-inch thickne This informant had a few words of advice for aluminum siding industry: "I suppose I shouldn't saying this, but the aluminum siding people are los out because of the lumber yards' poor merchandis record. They're losing millions of feet of siding foot a year on remodeling jobs. Call up the best lum yard in town; it might have aluminum siding samp and prices, but you won't get enough information them to wad a cannon with." About six of the ha board industry's 12 or 13 manufacturers are mak pre-primed siding—or at least marketing it. In sc cases a veteran maker of hardboard products will the pre-primed home siding product from anot outfit and tack on his own label. If all this sou rather grim, it is only by way of pointing out a c petitive facet not often discussed. The big consola of course, is a minimum potential of 360,000,0 squares of re-coverable surface, offered by all of single family dwellings in the U. S. — a market in wh all kinds of siding manufacturers can compete, make a living.



ALUMINUM, the tough metal

Aluminum can take it, in automobile engines or space vehicles. Through metal research and product development, Harvey Aluminum has made this tough metal tougher: *in forged pistons, connecting rods, clutch assemblies, and other rugged parts.*

At Harvey Aluminum, you'll find men of imagination. Use this source of technical knowledge to better the products you make. Odds are that you'll lower your manufacturing costs, improve design, or upgrade your quality.

Harvey Aluminum is a primary aluminum producer, from processing raw material to fabricating a full range of mill products. For a tough part, or for a decorative part, we're equipped to give you assistance with most any aluminum application. Your first step is to contact Product Development, Harvey Aluminum, Torrance, California.

HARVEY Aluminum

A primary producer of quality aluminum in all alloys and sizes: Pig, ingot, billet, rod and bar, pipe, tube, hollow sections, press forgings, forging stock, hand forgings, impact extrusions, electrical bus bar, rigid conduit, structurals, special shapes, light and heavy press extrusions, screw machine and other aluminum products. Related products in titanium, zirconium, and steel.

For Better Finish, Longer Die Life, Ease of Application In Your Extrusion Process Use Graphite Dispersions

JUST A FEW APPLICATIONS:

Extruding

High Temperature Lubrication

Parting

Die Lubrication

Drawing

Descriptive literature and working samples on request.

GRAPHITE PRODUCTS CORPORATION manufactures metal working dispersions for the newer metals and alloys. Each formulation has been developed for a specific application. Factory testing has shown that some of our compounds can be used successfully in many different operations. Bulletin 581 briefly describes some of these products and their uses.

GRAPHITE PRODUCTS CORPORATION welcomes the opportunity to develop formulations to meet your particular needs. A qualified staff consisting of application engineers as well as research specialists is as near as your telephone. For immediate service telephone TUxedo 9-4221 (Warren, Ohio).

GRAPHITE PRODUCTS CORPORATION
BROOKFIELD, OHIO

ALUMILITE
Sulfuric Acid Anodizing

Parts big or little, many or few

- 25 years experienced know-how can spell the difference between expensive and economical costs for you.
- Completely equipped for single job or contract work, with ample warehousing facilities, available to meet your production schedules on practically any size job.
- Send sample or drawing when requesting quotation.
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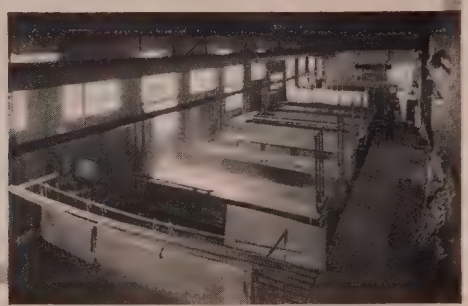
- Authorized licensee since 1932.
- It will pay you to know the Why, How and Where of Alumilite. Informative literature available.



Write Today

CITY PLATING & POLISHING CO.
DIVISION OF CIPCO CORPORATION
22nd & Cole Sts. St. Louis 6, Mo.

New Enterprise

Two companies have been purchased by Chica Steel and Wire Co., Chicago: All West Tire Produ Co., San Carlos, Calif., and Advance Mfg. Co., In Carlstadt, N. J. Terms were not disclosed.

Aluminum Alloys Corp. has moved into new, larg quarters at 245 45th St., Passaic, N. J., having vacat its Clifton, N.J., facility. Barney Kovacs, vice pre dent and chief engineer, says the new plant c produce 200,000 squares of aluminum **siding** a ye

A new aluminum extruding firm has been est lished under the name Regal Extrusion Corp. It located at 3601 North West St., Miami, Fla. Geor Green, president, says the firm will produce custo and standard **extrusions** and perform anodizing a other finishing services.

A plant to produce aluminum and steel argicultu and industrial **roofing and siding** is being built Regina, Saskatchewan, Canada by Nesco Aluminu Ltd.

Work on a $90,000 addition to the plant of Li metal Diecast Inc., Jackson, Mich., has begun a is expected to be completed by Fall. The new bui ing will replace an older one which was damaged fire last May. **Die casting** and other operations a proceeding during construction.

Saudi Arabia businessmen are seeking a Unit States firm, or group of backers, to help establi aluminum fabricating plants in Arabia. According the Commerce Department the group wants to ma aluminum **utensils** under a licensing arrangement similar plan. The Arabian businessmen expect a p tential investor to know the costs of such a proj and to assist in plant construction and operati personnel training, etc. If interested in such a v ture, contact L. T. Weathers, Arabian American Co., Dhahran, Saudi Arabia.

Another Florida citrus juice concentrate packer assembling its own six-ounce aluminum **cans.** Win Garden Citrus Products Cooperative, Winter Gard has installed a line capable of producing 80 milli units a year. Reynolds is supplying the fabrica can ends and sheet for can bodies; Bliss built the fa cating equipment. Minute Maid is operating t such lines.

The Unit Container Division has been established Ekco-Alcoa, Wheeling, Ill., to develop products a markets for one-portion, aluminum-foil **containe** Louis Schuum is general manager, Robert Took sales manager.

Chicago Extrusion Tool Co. is an **extrusion die** sh opened recently at 2802 Bernice Road, Lansing, William "Whitey" Blauw, owner-manager of the fi

(Continued on page

HOMOGENIZING FURNACE

ANLY HI-TEMP PANELS are operating at nperatures up to 1250° F. Contrasted with nventional brick construction, they afford the lowing:
Lower initial material investment cost.
Lower installation cost.
Lower maintenance cost.
Lower operating cost.

The development of LANLY HI-TEMP PANELS made possible this aluminum billet homogenizing furnace.
Available in either hot car or car bottom type, it is representative of the many Lanly installations in the light metals industry.

THE lanly CO.

Lanly custom designed equipment of panel construction is available for a wide variety of heat processes.
Bulletin No. 480 entitled, "Lanly and Light Metals" pictures several of them.
Write for your copy.

Find Your Representative In The Yellow Pages

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Atlanta, Georgia • Birmingham, Ala. • Boston, Mass. • Chicago, Ill. • Cleveland, Ohio
Toronto, Ontario • Columbus, Ohio • Detroit, Mich. • Buffalo, N. Y.
Pittsburgh, Pa. • Rochester, N. Y. • Portland, Ore. Seattle, Wash. • St. Louis, Mo.

DIRECT
LINE
SERVICE
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FUSSIER THAN MOST ON QUALITY?

Then you should be interested in the way that 95 years' of metals specialists experience has been applied to aluminum production by Bridgeport. The production and technical staffs have been selected from men who have grown up with aluminum and know its quality problems intimately. These men are available, because of our unique "Direct Line" sales policy, directly to our salesmen. This means that you can get authoritative decisions—and quickly—right from the Bridgeport men who must meet your requirements.

Aluminum sheet is rolled to "special metals" quality by Bridgeport's modern mills at Warren, Ohio and Riverside, California. Well stocked Bridgeport Metal Service Centers provide quick local service in major metalworking areas nationwide. Bridgeport salesmen and deskmen offer a helpful objective service to metal buyers in the proper selection of aluminum, brass and copper alloys . . . call Bridgeport Brass Company, Bridgeport, Connecticut . . . offices in principal cities.

COILED AND FLAT SHEET: WIDTHS to 48", GAUGES 0.006" to 0.125"—**IN ALLOYS:** 1100, 1145, 3003, 3004, 5005, 5050, 5052, 5357, 5457, 5557 . . . Bringing 95 years of metals experience to the production of quality aluminum.

BRIDGEPORT BRASS COMPANY

_UMINUM SHEET

Bridgeport

carl mayer Designs and Builds
Better ALUMINUM Extrusion
AGEING OVENS

This truck type oven is now in service at Penn Extrusion Corporation, Erie, Pa. Close temperature control is maintained through the use of two gas fired, recirculating air heating systems. Other Carl Mayer design features assure trouble-free, economical operation. Write for Bulletin HT-53.

THE **carl mayer** CORP.
20800 CENTER RIDGE ROAD, CLEVELAND 16, OHIO
OTHER PRODUCTS: Core & Mold Ovens • Rod Bakers • Paint and Ceramic Drying Ovens • Special Processing Equipment & Accessories

FISKE'S F-456 Fluid Die Compound

A fluid product for spraying in its natural state—less frequent applications permits greater production—keeps dies clean with no build up—improves surface finish—prevents sticking and soldering—minimizes carbon formation—reduces fumes and smoke.

FISKE'S SINCE 1810
METAL WORKING LUBRICANTS
FISKE BROTHERS REFINING CO.
129K Lockwood Street, Newark 5, N. J.
Plants: Newark 5, N. J. and Toledo 5, Ohio

says he has a complete design and engineering servi in addition to his tool making facility.

A new corporation, Aluminium Europe, has be created in Brussels, Belgium, under the joint sponsc ship of Reynolds International, Inc. and the Socie Generale de Belgique, a holding and investment fir The new company will build a plant in Belgium f the fabrication of aluminum products.

Fred M. Zeder II, president of Hydrometals In New York, has announced that his firm will expand to the **foil** field; that through a stock exchange w acquire the Stranahan Foil Co., South Hackensack, N

Plans are being readied by the Canadian-Brit Aluminium Co. to start construction within 2 years facilities to add 45,000 tons of annual capacity to **primary smelting** plant at Baie Comeau, Que. Pres capacity is 90,000 tons annually.

The new $250,000 plant of Accurate Die-Casti Corp. has started production at Bridgman, Mich. It expected to be operating at full capacity, and us 200 workers, within a few months according to M. Gilman, president of the new company. Vice presid is Fred Gelesko.

Nearly 16 million pounds of aluminum **electri cable** will be used in Arizona Public Service Co.'s r 345,000 volt transmission line to extend 300 miles fr New Mexico to Phoenix, says Kaiser Aluminum Chemical Sales Inc., Oakland, Calif.

Production has started at National Lead Co.'s r **die casting** plant at Boulogne, Argentina. The pla operated by subsidiary Doehler Argentina S. A., die-cast aluminum, magnesium, zinc and brass p for autos, appliances, etc.

The assets and business of the aluminum **hard c ing firm**, Sanford Process Co., Inc., Los Angeles, Cal have been acquired by Electralab Printed Electro Corp., Needham Heights, Mass., subsidiary of Farr ton Mfg. Co. It was a stock transaction. J. B. Frank Sanford vice president, will hold the same position w EPEC.

A 1250-ton extrusion press has been installed in he Fullerton, Calif. plant of Ador Corp., manufact of aluminum **sliding glass doors** and windows.

A subsidiary of Willard Bronze Co., Cincin has been opened on D. F. W. Lake Road in Gra N. C. Known as Willard Industries Inc., the plant produce **precision and permanent mold castings.** It employ 200 persons and is claimed to be one of largest independent aluminum foundries in the So

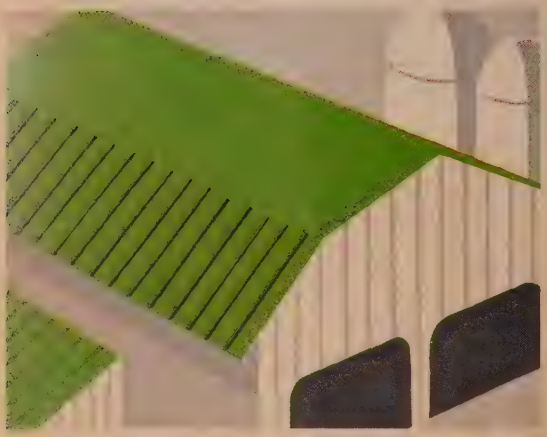
Aluminum **siding** specifically for new home cons tion will be produced and marketed by Etling Win Barberton, Ohio. The millwork firm will also intro a new line of aluminum siding and awning win and patio doors. All aluminum products will be pro duced in a 75,000-square-foot plant being complete Barberton.

FERRO

as the answers for you on

ALUMINUM
PORCELAIN
ENAMELS

Engineering
Metal Preparation
Frits and Colors
Application
Firing



PERMANENT "CARE-FREE" COLOR ADDS SALES APPEAL TO ALUMINUM

Ferro "know-how" can help you use Porcelain enamel

Permanent, care-free Porcelain enamel gives any manufacturer a real sales advantage in today's competitive markets. And especially in products made of *aluminum*, for here is eye-catching *color* that is as enduring as the metal itself.

Porcelain enamel brings "lifetime" beauty to products. Will not fade or streak. Requires no maintenance. And it is easily applied to aluminum, lends itself well to volume production, requires only a nominal capital investment for the necessary processing equipment.

Ferro designs and builds complete facilities, then furnishes frits, colors and all production materials required for the porcelain enameling of aluminum. Ferro, as world leader in porcelain enamel, has done much to make the process "foolproof" and economical. Our staff of engineers, builders, process and color specialists will be happy to show you how it can be profitably used in your business.

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4155 EAST 56 STREET • CLEVELAND 5, OHIO

PLANTS IN CLEVELAND, NASHVILLE, LOS ANGELES AND ELEVEN FOREIGN COUNTRIES

Useful Data

ethods of **chemically preparing aluminum** for re-nce welding are detailed in bulletin F.11026 by ite Products. Fully discussed are the following paration methods: Cold deoxidizing tank immer-, hot deoxidizing tank immersion, cold deoxidizing y washer, procedures for producing satin finish. booklet write Edward Carlson, Oakite Products , 19 Rector St., New York 6, N. Y.

baking finish claimed to be tough and chemically stant, is described in a 4-page flyer by Universal nt & Varnish Inc. Booklet gives information on esion, packaging, cost, application and other im-tant details. Results on coated aluminum exposed 20% salt fog test at 95°F are given. Contact S. D. ds, Universal Paint & Varnish Inc., Bedford, Ohio.

luminum **extrusion ingot** is studied in an Alcoa klet which includes data on a new composition and alloys previously unavailable in ingot. Listed are data as chemical composition limits, characteris-, typical uses, mechanical properties, recommended rmal treatment, standard sizes and sources of Alcoa rusion ingot. Copies are available from any Alcoa s office or Aluminum Co. of America, 1501 Alcoa lding, Pittsburgh 19, Pa.

"**Facts About Aluminum Siding**" is a new Reynolds blication. It includes estimates of costs of repainting od siding, gives figures on the steady rise in the use aluminum siding, and reviews the product's ad-ntages. For booklet, write on company letterhead to ynolds Metals Co., PRD 48, Richmond 18, Va.

Pre-coating of metal coils and sheets is discussed in Finish catalog 361. The capabilities of the firm's ee coating lines are detailed, the various finishes that n be applied are covered and their ability to with-nd the rigors of fabrication procedures such as form-, shaping, drawing etc., are discussed. Photos of the n's newest coating line and a description of its seven in advantages are included. For a copy of this bro-re write Roy Crabtree, Pre Finish Metals Inc., 2111 Pratt Blvd., Elk Grove Village, Ill.

A unit for **feeding metal coils** into any type of press uipment is described and illustrated in Form 11 by E. Dickerman Mfg. Co. The booklet tells when each two models—a 9 and a 12 inch—should be used. vered are the 13 main features of the equipment companied by a diagram showing each unit com-nent), its specifications, and typical applications. For copy write H. E. Dickerman, H. E. Dickerman Mfg. ., 321 Albany St., Springfield, Mass.

Air and electric impact wrenches and other power uipment used for fastening are fully covered in bertson & Co. Sioux line catalog. Pictures of various odels are shown, data such as socket drive size square, lt size capacity, torque, etc., is given and a case his-

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Let Atlantic Fill Your Prescriptions!

Our Sales Engineers are available for quick diagnosis . . . or if you prefer, we'll send you a complete "Quick Reference" listing of our Stock-on-Hand.

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Atlantic's combination of active ingredients* works like a doctor's prescription. It helps relieve P.A. headache and tension caused by High Costs, Late Delivery, or general Un-availability. Atlantic effectively eliminates the cause of such distress. Next time you're suffering from P.A. headache call us collect! You'll get speedy relief!

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Over 2,000,000 lbs. in stock • Sheet • Rod • Bar
Coil • Tube • Circles • Structurals • Extrusions
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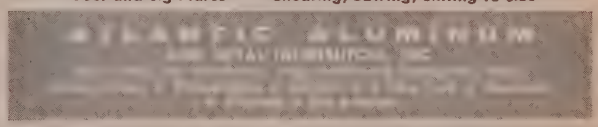

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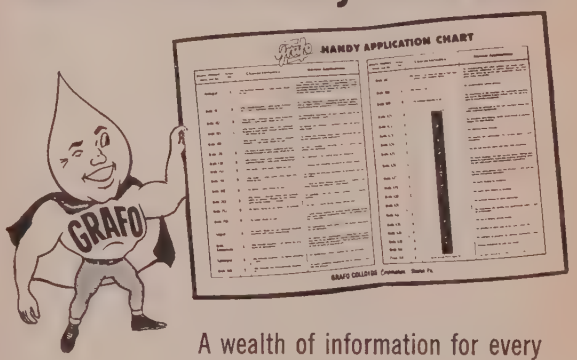

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tory of each tool is included. H. A. Jacobson at Albe son & Co., Inc., 2801-2999 Floyd Blvd., Sioux City Ia., will send a copy.

Flat finishers for grinding, polishing and deburri flat work are covered in catalog FF-755 by Hammo Machinery Builders. Specific data and description given on conveyors, hold-down rolls, platens, and hea Various models are pictured and full specificatio given. A special section pictures numerous produ which have been finished on such equipment—sh supports, typewriter parts, extrusions, skate blad etc. Accessories are also detailed. For booklet wri W. C. Johnson, Hammond Machinery Builders, In 1600 Douglas Ave., Kalamazoo, Mich.

Cleaners for aircraft modification, maintenance a manufacture are detailed in a new Wyandotte b chure. Included are products for aluminum, magn ium and steel cleaning, spray booth maintenance, a minum brightening, carbon removal, cleaning of a craft exterior, exhaust stain removal, integrated fu tank descaling, paint stripping. Folder is illustrat with photos of cleaning processes and firm's resear and manufacturing facilities. Write Robert Rai Wyandotte Chemicals Corp., J. B. Ford Division, W andotte, Mich.

Machining aluminum with automatic screw m chines is subject of revised 104-page Kaiser bookl Tooling drawings are included showing cutting angl used for aluminum; individual tables show feeds a speeds used for end and side-working tools. Includ are speeds and feeds for drilling, boring, reaming, tur ing with box and knee tools, recessing, forming, ta ping, threading and knurling. A chart indicates p sible troubles encountered in machining as well practical remedies. This chart covers single point, f and circular form tools, drilling, counterboring, ta ping, threading, skiving and cutting-off. For copy book write Technical Publications Dept., Kaiser A minum & Chemical Sales, Inc., 300 Lakeside Dri Oakland 12, Calif.

Galvanic relationships between aluminum and m nesium alloys are covered in a reprint offered by D Metal Products Co. Firm says paper was prepared demonstrate some of the principles which determ the compatibility of aluminum alloys toward magn um alloys and to illustrate how these principles can used in corrosion control. Charts and diagrams used to show the effects various contaminants have the two metals. For reprint write Clay Dickey, D Metal Products Co., Midland, Mich.

Controlled angle tungsten-inert-gas (TIG) arc we ing torch produced by Falstrom is covered in bulle WC/60. Eight design features of the torch are illust ed and explained; various torch angles obtainable shown; five case histories prove type of work torch been used on. Torch specifications are given and the of operation is presented. For copy of bulletin w Walter Clapp, Falstrom Co., 151 Falstrom Court, saic, N. J.

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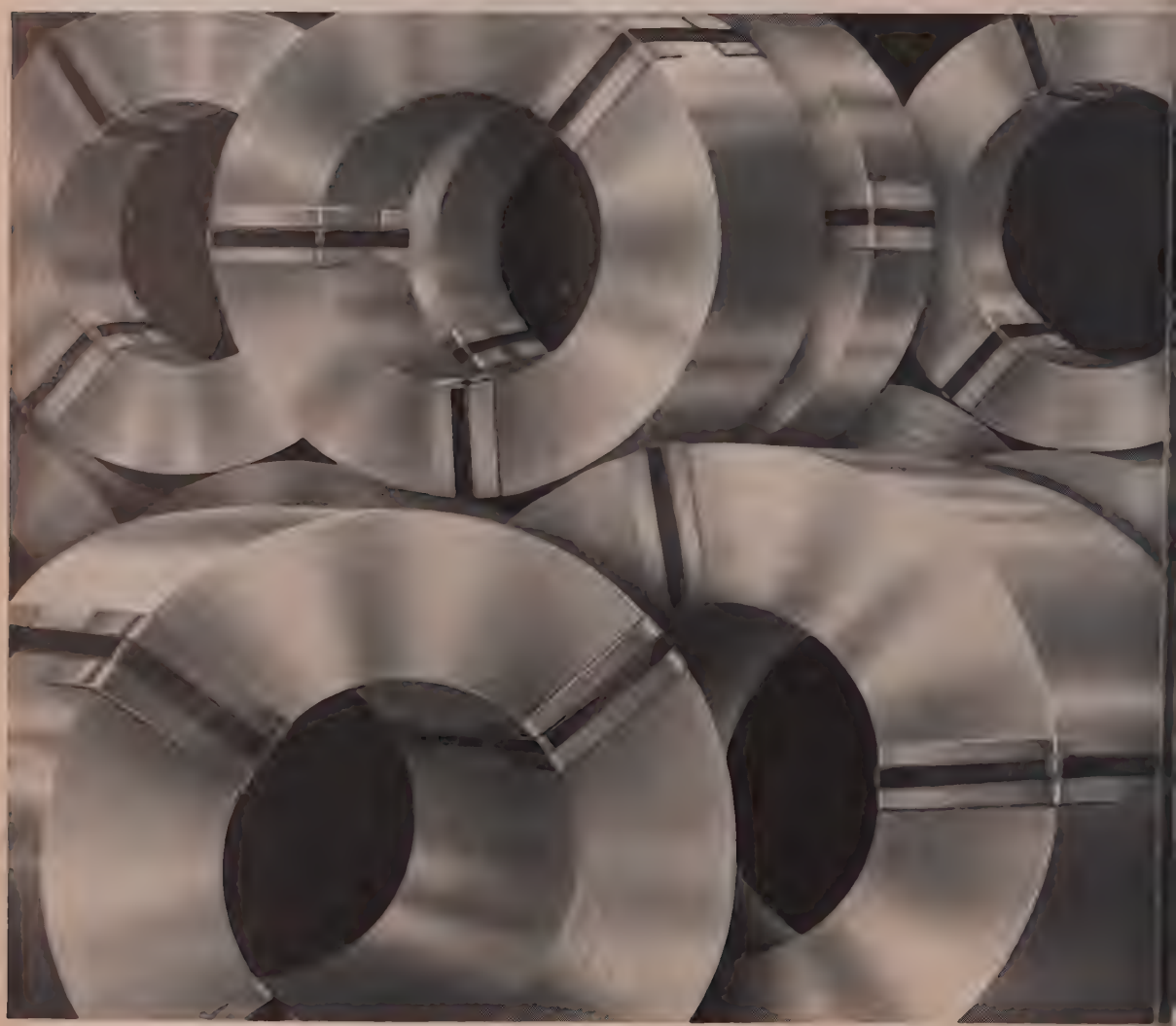
Take a lead from the leaders...

Amchem ALODINE* Improve Adhesion of Coated Coil i



Fifteen years and many millions of pounds of Alodized painted aluminum and Granodized steel sum up Comaco quality.

Corrosion Resistance, Paint 5-Year Record at COMACO

Mr. Roland Harrison, President, Comaco, Inc.

"PAINT ADHESION IS THE SINGLE MOST IMPORTANT FACTOR IN OUR OPERATION—ALODINE GIVES US THE BEST POSSIBLE PAINT JOB"

producing custom coated coil and strip, awnings, n and screen doors and aluminum building products, iable paint finish is the "showcase" of quality upon h customers judge the product. At Comaco, Inc., erstown, Pa., the answer to superior paint adhesion been the Alodine chromate conversion coatings, ified and used almost since the company's inception.

r 15 years, the Alodine process has pre-treated mil- s of pounds of aluminum to provide superior paint ding and increased corrosion resistance for Comaco products.

ently, Comaco who also produces coated steel strip, switched from a competitive phosphate coating process to Amchem Granodine**, has achieved considerable savings in chemical cleaners and treatments. Comaco finds Amchem technical service "definitely superior." Independently conducted quality tests by Comaco, Amchem and Comaco's paint supplier show Comaco-produced, Alodine- and Granodine-treated metals to have maximum paint adhesion.

When you need conversion coating for steel or aluminum and competent technical service *take a lead from the leaders* and specify Amchem for all-around superiority. There's a local Amchem Representative near you and he's a metal protection expert.

*Amchem's registered trademark for its conversion coating chemical for aluminum.

**Amchem's registered trademark for its conversion coating chemical used to produce phosphate coatings on steel.

neral overall view of Comaco's inch combination Alodine and nodine metal preparation line.

Operator controlling chemical flow in Granodine tank. Six-stage line accommodates both aluminum and steel.

Comaco inspector makes visual inspection of coated coil being run through the paint coater.

AMCHEM **ALODINE**

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Sleek Finish Sells Luxury Cruisers

Fine finish of a boat like this 75-foot, welded aluminum pleasure cruiser, South Seas, tells viewers of quality features below decks. But finish must be on to stay. Here's how Burger Boat Co. does it.

"HERE is an old story about a neophyte millionaire who asked '. Morgan what it might cost to ıtain a yacht the size of the *Corsair* '.'s boat), because he intended to buy Morgan's reply was to the effect if he had to be concerned about is he had better forget about owning ıcht.

espite Morgan's cavalier attitude to- l money, it's safe to assume that t of today's crop of millionaires are ·rent in that they don't like to waste stuff. Maybe that's how they got rich. ıny event, it's certainly one expla- on for the trend to aluminum con- ction in large pleasure cruisers.

he light metal offers definite advan- s, not the least of which is operating ıomy. Also, an aluminum hull makes ıster, more maneuverable boat. Au- ity for this is Henry E. Burger, ident of Burger Boat Co., Manito- , Wis.

Our 1960 business definitely reflected increasing trend toward aluminum sers," Burger said. "An important on is the need for lighter hulls."

urger explained that more equip- ıt goes into a boat, these days, than or 15 years ago.

The average yacht today," he said, npletely lighted, with heating and conditioning, and all the electronic igating instruments, must take larger considerably heavier equipment ard than was used years ago.

Consequently, our smaller steel boats ame overloaded and aluminum was means of gaining equal or better formance compared to the older es. We have made a substantial sav- in weight which translates into ed that you might have had years with the very limited amount of uipment that used to go aboard a t of comparable size."

The Burger firm began building boats ıost a century ago when wooden ooners were in demand for the Great kes lumber trade. Burger built wood- en yachts for many years, and progressed to steel in the building of commercial fishing, cruisers and sail boats (called "tin cans" by the competition) in the 20's. During World Wars I and II and the Korean War the company built minesweepers and sub chasers.

In 1954 Burger began experimenting with aluminum, and built a 36-foot all-aluminum cruiser. In 1957 the firm launched the *Dyna* and the *Aria*, the first and largest all-welded aluminum yawls ever built in the U. S. (MM, Sept. '57).

"Our steps from wood to steel to aluminum have been accomplished by substantial strides in size increment," Burger said. "Twelve years ago the Burger 50 and the Burger 53 were regarded as the ultimate in pleasure cruising. Today, we build standard 54-foot cruisers and auxiliary hulls up to 92 feet long. We are the leading builder of custom and semi-custom metal pleasure cruisers and yachts above 60 feet in length."

An Important Decision

Boats this size put Burger Boat Co. in a select group of yacht builders.

"A great many firms were forced out of business by foreign competition," Burger explained. "Our salvation was the decision in the old days to build a standard line. This has materially reduced the cost to the boat buyer. He can save a great deal of money on the cost of the hull and still have a custom arrangement."

After more than 30 years' experience in welding steel, the firm had no great difficulty in learning the techniques of successful welding of aluminum. Hitting on a proper painting practice for aluminum hulls came a little harder. Finish-painting a boat is a critical phase of the entire building effort.

In a fine boat, as in a fine automobile, sleek, unblemished appearance is the visual token of underlying quality. Without it a sale would be all but impossible, and the wealth of scientific know-how that went into its construction would be wasted.

Improper hull preparation is the major pitfall in painting boats, according to Elias Gunnell, vice president of Burger Boat Co. It's a ticklish, painstaking job to come up with a hull surface that will be entirely free of contaminants that cause finish coatings to crack or peel even while they are still new.

Burger's first and only unhappy experience with a peeling aluminum hull occurred in 1954. Carelessness in the application of a pre-treatment compound caused the trouble. When Burger had cleaned off the paint to bare metal and had repainted the hull, total cost of the blunder was reckoned at between $6000 and $7000.

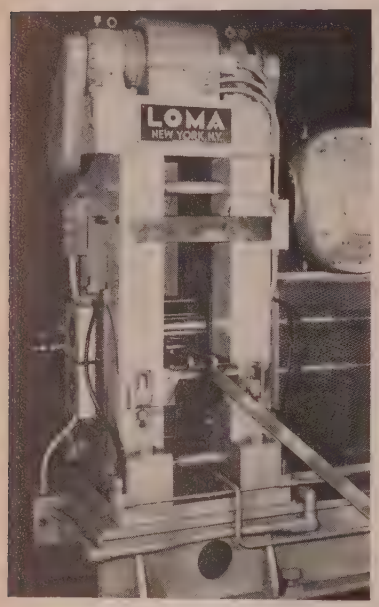
"But worse than the monetary loss was the threat to our reputation," Gunnell said. "A Burger boat is synonymous with meticulous workmanship; the same care that produces a piece of fine furniture is given construction of one of our pleasure cruisers. We don't intend to let a mistake of this kind happen again."

Burger Boat goes to what might be considered extravagant lengths in its quest for the perfect paint finish, but there is really no easier way. To achieve a permanent paint bond, it is necessary to apply a uniform conversion coating. But this can be obtained only on a uniformly clean aluminum surface.

The difference between applying a conversion coating to, say, coiled aluminum sheet intended for siding or awnings, and pre-treating an aluminum boat hull is that the latter is likely to have a far greater accumulation of dirt, shop soil, scale and oxide film because of more involved fabrication, welding, etc. An indifferent cleaning job would result in an uneven conversion coating which naturally would create weaknesses in subsequent finish coats.

Intensive treatment of a Burger aluminum hull begins with a light sand blast of the upper portion of the hull (entire topsides to waterline level). Care

NEWS FROM
LOMA



A wide variety of metallurgical processing work can now be performed by a single mill facility due to the development of this compact and versatile LOMA 2-high/4-high Combination Rolling Mill. The equipment is suitable for both hot and cold work, and allows both shapes and flat stock to be rolled, with or without the application of tension.

The machine is equipped with extra large capacity mill housings, roll journals, universal spindles and drive transmission. This heavy-duty design allows the mill to take reductions of more than 50 per cent per pass while maintaining tolerances as close as 5 per cent of thickness.

Change-over from the 8½ in. x 10 in. 2-high to the 2½ in. & 8½ in. x 10 in. 4-high setup requires only 30 minutes. The 2-high arrangement is used for either hot or cold breakdown rolling of plate and sheet, and grooved rolls are also available to process rounds, squares and other shapes. In the 4-high setup strip is cold finish rolled to gauges as thin as 0.002 in.

The LOMA mill is furnished with high-strength steel housings, twin-handwheel or dual-motor wormdrive screwdowns, universal joint spindles, herringbone gearing, and an extra heavy-duty 25 h.p. variable-speed drive. The rolls are made of forged alloy steel and are hardened to 100 Shore Scleroscope. The roll necks are mounted in super-precision needle roller bearings having a total separating force capacity of 350,000 lbs. The bearings are continuously lubricated by a closed oil circulating system.

LOMA
MACHINE MFG. CO., INC.
114 East 32nd Street
New York 16, N. Y.

is taken to keep this treatment light. Heavy sand blasting might damage the surface.

The hull is then given two separate brush coatings of Deoxidine, a deoxidizing compound supplied by Amchem Products Co., Ambler, Pa. The fact that Burger uses two applications of the wash when one is considered sufficient is evidence of the firm's care in the matter.

The Deoxidine is a phosphoric type chromate deoxidizer which is mixed with equal parts of water in a rubber or plastic pail. When it is brushed liberally on the surface, the operator scrubs the oily surfaces thoroughly. The hull surface must be kept wet with the Deoxidine solution (re-applying additional solution if necessary) for 1 to 3 minutes before rinsing with water.

"An obstacle to mechanical cleaning of aluminum is that the metal becomes imbedded in the brush or grinding wheel," Gunnell said. "There's no real way of getting aluminum clean except by chemically treating it."

The conversion coating operation follows the Deoxidine treatment. This type of coating wards off corrosion, particularly that induced by moisture, and provides an excellent bond for paint. Burger Boat Co. brushes on Alodine 1200S, another Amchem product. The thin, gold colored, gel-like film that is produced is an integral part of the metal, but converted to a nonmetallic form.

Chromate treatments such as Alodine 1200S produce effective paint bonds through molecular adhesion. The gold color imparted by Alodizing allows visual inspection of the hull for missed spots. When these have been gone over the entire hull is ready for the wash coat primer.

This very thin (.3 mil depth) zinc chromate coating is applied for cathodic protection. Following this coat, cement is troweled on at various points above the waterline to fair up the irregularities of the welded structure.

When all the cement has been applied, the hull surface above the waterline is given one coat of white vinyl followed by two coats of yacht white semigloss.

The part of the hull below the waterline is given one .8 mil coat of zinc chromate primer (a different formulation than the wash coat primer mentioned above), followed by two .2 mil coats of gray vinyl, and one .1 mil coat of vinyl anti-fouling paint in the color desired. This last coat is generally copper-bearing to kill the marine life that always attaches itself to ship bottoms.

Today's primer and finish coats have an excellent performance record, according to an executive of a paint manufacturing firm that supplies coating materials to Burger. He said that those are made by most of the nation's leaders in the paint industry.

Burger Boat Co. has used these priming, treating and finishing techniques, from bare metal to finish coat, consistently since 1954, and considers it the best system available to achieve an attractive, durable finish. Best evidence of this is that the champion racing yawl, *Dyna*, still has her original basic paint job after four years of sea water and fresh water competition.

■ ***Burger finishing procedure is probably the most painstaking in the boat building industry. Here a yard hand is brushing on Alodine 1200S conversion coating. Sand blasting and a deoxidizing treatment preceded this. Care, coupled with sound p- treatment, is what produces an enduring finish, according to Burger Boat Co.***

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Press Brake Forming Aluminum Light Reflectors

Fluorescent bulbs have advanced to the point where they provide nearly three times as much light as before; and aluminum reflectors are claimed to be the most practical and efficient for directing light downward to work plane.

ADVANCES in light source technology have resulted in fluorescent lamps providing nearly 3 times as much light per foot of lamp length as former lamps. The development of these lamps was most timely since they make it easier to economically provide the higher illumination levels that research has proven to be required. Providing these levels comfortably with lamps 3 times as bright as previous lamps posed a production problem.

The Miller Co., Meriden, Conn., solved this problem through the use of properly-contoured aluminum reflectors in two lines of luminaires designed for use with these potent new lamps. Aluminum was used because it offered the most efficient and practical means of directing the high output from the lamps downward to the work plane and not into workers' eyes.

Unlike paint and porcelain enamel, which scatter light in all directions, aluminum restricts the reflected light to a narrow zone. The use of No. 31 Reflector Sheet assures high reflectance even after anodizing, which provides permanence but often results in a low reflectance when premium sheet is not employed.

For offices, stores, and public buildings, Miller produces single- and twin-lamp troffers with parabolic aluminum reflectors. Each reflector provides 41° to 45° (depending on lamp used) crosswise shielding and directs all light almost straight down so that the brightness seen throughout the shielded zone is very low. A steel louver with a special low brightness enamel finish provides 45° lengthwise shielding.

The .040-inch aluminum reflector material is cut to length and width, then anodized in the flat. The sheet is then sprayed with a plastic liquid envelope to protect the finish during fabrication. The blank requires three piercing and three press brake forming operations, after which the plastic envelope is peeled off and the reflector is ready for final assembly.

The reflector at this point is 48 inches long x 12 inches wide x 7¼ inches deep and weighs 4 pounds 3 ounces. End closures are mechanically locked to each end of reflectors for 4-foot luminaires or to one end of reflectors for 8-foot luminaires.

The die-formed .040-inch aluminum end plates for each reflector have 10 tabs which protrude outward on two sides of the end plate. These are inserted into 10 slots in the reflector from the inside. The tabs are then bent over on the outside of the reflector with a reciprocating hammer (see photo). The inside surface of the reflector, which will be in view in the installed unit, is thus left with a clean appearance.

Reflectors that are to be used in luminaires for 8-foot lamps are permanently joined together by a band of .040-inch aluminum, riveted in place with aluminum pop rivets manufactured by United Shoe Machinery Cor... These blind type rivets can be inserted and set from the same side of the wor...

The hydraulic gun used weighs ... pounds. The retracting jaws in the gu... pull the mandrel head into the riv... on the reverse side until the mandr... breaks under tension. This high clin... action exerts up to 600 pounds holdi... pressure.

Optimum lighting of industrial ar... can be obtained with the Miller S... ereign, featuring Alzak aluminum ... flectors that provide 35° crosswise shie... ing and excellent brightness control ... the shielded zone. The reflector assem... consists of press brake-formed alu... num side panels and a V-shaped chan... cover forming separate reflector co... partments of modified parabolic c... tour for each lamp.

The side panels are formed fr... aluminum blanks approximately 48 ... 6 inches and are reinforced at each e... by heavy gauge, form-fitting steel s... ports that attach to the steel wir... channel assembly. These supports p... vide separation between the chan... and reflector sides to form a conti... ous aperture above the lamps to obt... up-light and ventilation.

The aluminum channel cover ... formed from blanks approximately 4 ... 10 inches, and attaches to the wir... channel by a spring-loaded cam l... at each end.

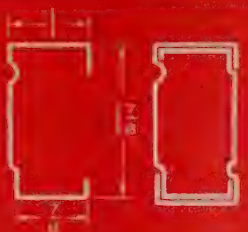
■ *Aluminum end plates are attached to troffer refl... on (above) by bending over 10 end-plate tabs protruding thr... igh slots in reflector. Pop rivets, set with hydraulic gun, are us... to join 4-foot reflectors by band of .040-inch sheet.*

PART: Stiffener for display shelving. Same set of rolls makes both large section (front shelf edge and price moulding) and hat section (middle and back reinforcement).

MATERIAL: CRS 22 ga. (.0296").

STOCK WIDTH: Large section, 7⅛"; hat section, 4¾".

SPEED: 65-90 fpm.

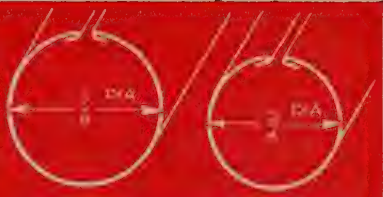


PART: Awning structural support. Used as single members or assembled as a box.

MATERIAL: .051" Aluminum and CRS.

STOCK WIDTH: 4".

SPEED: Approximately, 65 fpm.



PART: Slats for home motion picture screens. Two sizes, run continuously with automatic cut-off

MATERIAL: 24 ga. CRS, pickled and oiled.

STOCK WIDTH: 2.875" for ⅛" diam. tube; 2.500" for ¼" tube.

SPEED: 60-90 fpm. depending on lengths cut off.

PART: Table slide hardware, telescoping sections

MATERIAL: 18-20 ga. CRS (.045" and lighter).

STOCK WIDTH: Outer, 2¼" (run on machine auxiliary side); inner, 2" (run on inboard side).

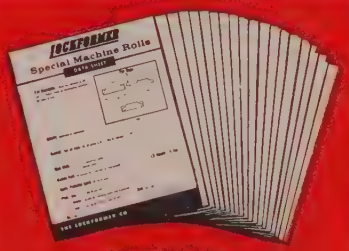
SPEED: 90-95 fpm.

PART: Sign and display backframe. Formed section serves as hinge for access to electrical parts

MATERIAL: 20 ga. CRS.

STOCK WIDTH: (Sheet edge operation)

SPEED: 60-65 fpm.



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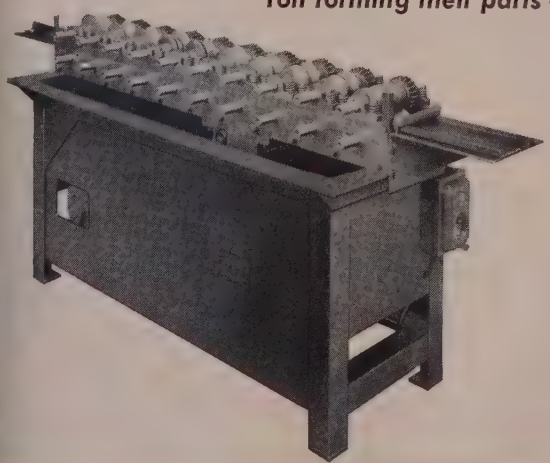

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Aluminum Sheet for Big or Small Orders

High heating and cooling rates of oxygen-free ovens enable Bridgeport Brass mill to produce high-volume, quality sheet yet reduce annealing time by one-third to one-half

THERE is no point in doing things halfway when setting up new production facilities in a business as competitive as the aluminum industry.

This is the principle that guided Bridgeport Brass Co. when it was laying out its new aluminum sheet mill at Warren, Ohio. Bridgeport adopted a new approach to the high volume production of quality sheet. Although rolling mills, slitters and other fabricating equipment received proper attention, the focus was on the ovens.

Putting together plans for the new mill, Bridgeport made a simple decision: "Our average product had to be equal to the competition's best," explained Kenneth M. MacQuarrie, plant manager. Result: Few major innovations in technique, but intense attention to the design of facilities for top quality across the board, and flexibility to handle both big and small orders with equal dispatch.

Ovens are among the larger equipment investments in aluminum sheet production. They are critical not only because annealing practice directly affects surface finish quality, but also because annealing time is the big bind in the production cycle.

Staining and oxidation of sheet surfaces are major quality problems in production. Rolling lubricants tend to break down and stain the sheet surface when oxidized at high temperatures. The newer industry practice has been to anneal in an oxygen-free atmosphere.

Automatic Stain Prevention

Bridgeport's approach at Warren is that all ovens are equipped for controlled atmosphere annealing. Even when full annealing isn't called for, stress relieving is done in oxygen-free atmosphere. Stain prevention is automatic, not dependent on order specification.

However fast the rolling mills and slitters are, the annealing process — heat, soak and cool — can take longer than three shifts to complete. The average order makes at least one trip to the ovens, often two. One answer is bigger ovens to handle more sheet.

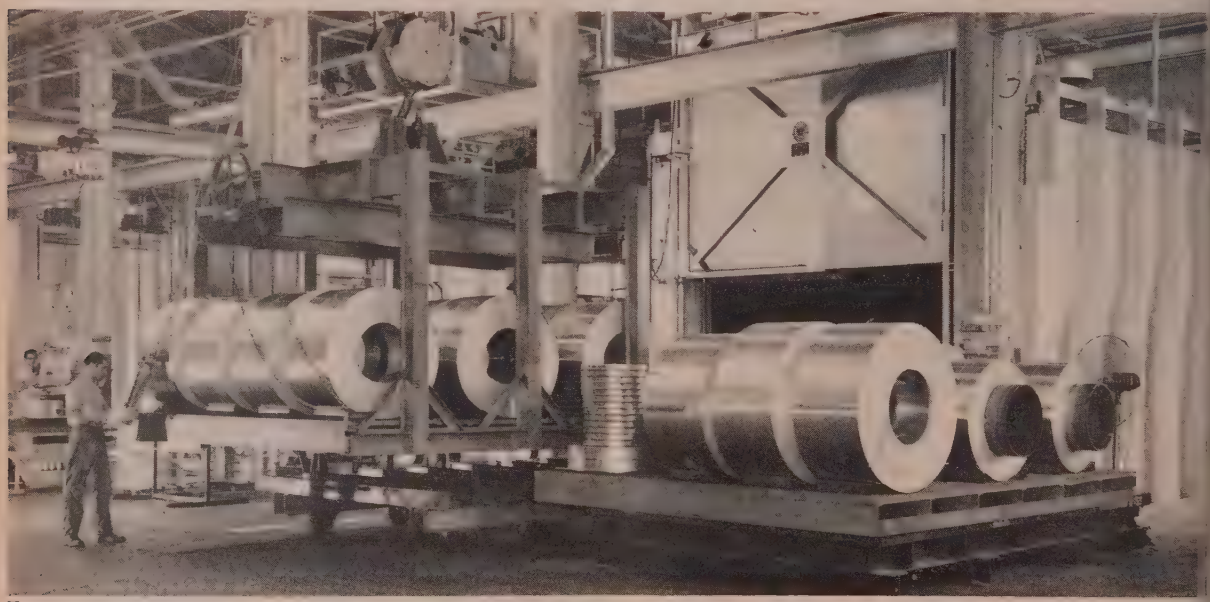
Bridgeport took an alternate route — medium capacity ovens with high heat and cool rates, all designed for oxygen-free annealing. This means oven can handle small orders if necessary without snarling the plant schedule. Translated to the sales side of the ledger, it means small volume buyers are assured of fast service and top quality sheet.

Each of the oxygen-free ovens has a capacity of 30,000 pounds and total heat input of 6 million btu per hour. High heat input cuts annealing time from one-third to one-half. Faster heating also improves grain size of the metal.

Complementing the high heat rate is the extra large cooling capacity — 2 million btu per hour. Rapid cooling means faster turnover; it frees ovens to handle more loads per day.

Atmosphere for the ovens is supplied by two 15,000 cfh exothermic generators. Oxygen level is held to less than one-half of one per cent. A four point oxygen analyzer and recorder monitors the furnaces, sequentially switching through solenoid valves to the analyzer and printing the number of the line record

(*Continued on page 39*)



View of oxygen-free annealing ovens at new Warren, Ohio aluminum rolling mill of Bridgeport Brass Co. With medium-capacity, oxygen-free atmosphere ovens that deliver high heating and cooling rates, Bridgeport can handle small orders with same service and quality assurance as big orders. High heat rate also improves grain size of annealed metal.

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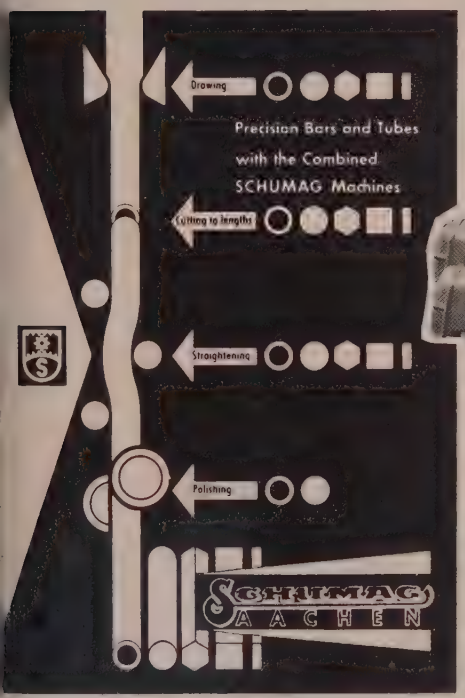

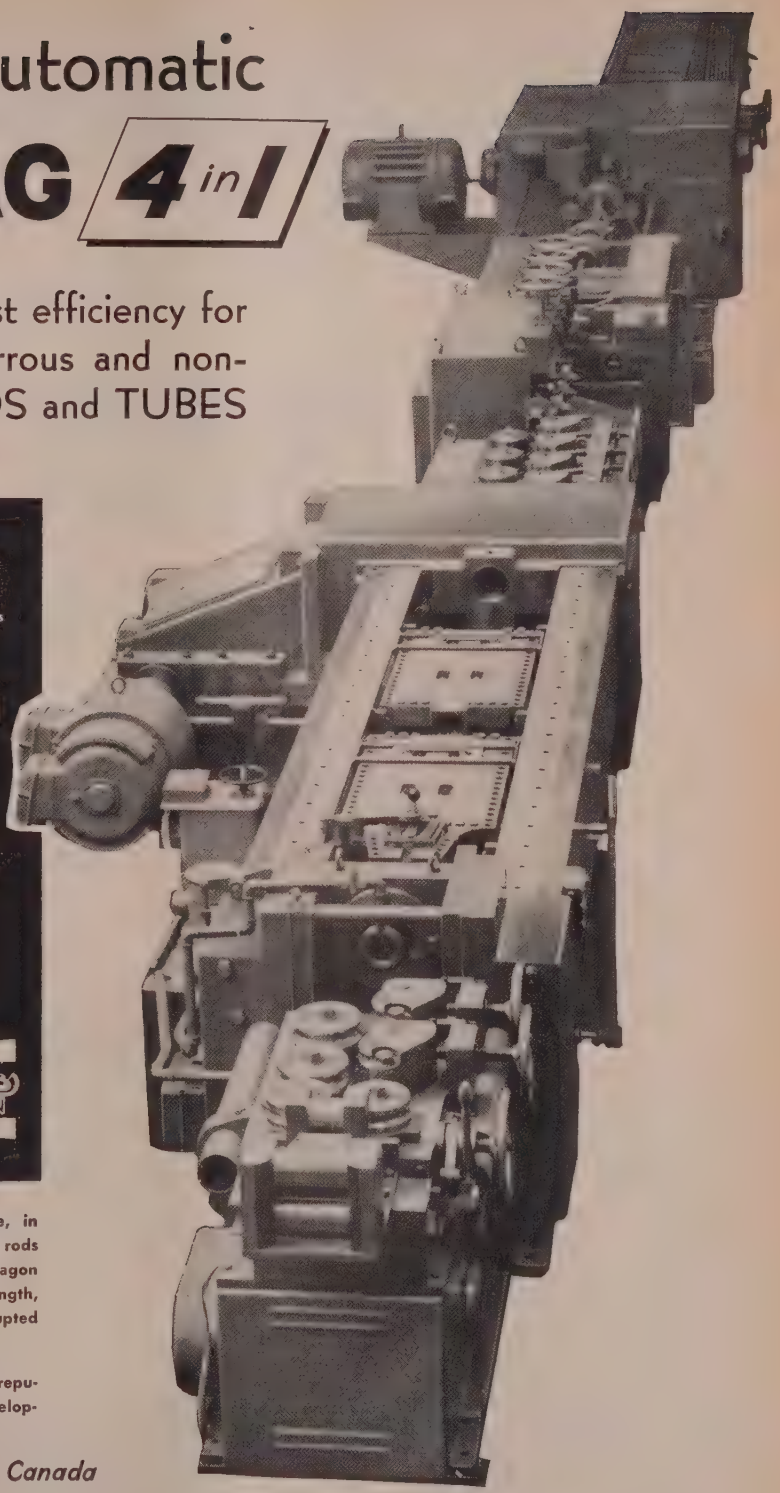

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oil stock, and plate are now
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oduces aluminum extrusions,
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ed. An alarm is also included to operate in the event of deviation from the established per cent range.

Full annealing of 2500-pound coils in a single layer of 12 coils per tray takes 12 hours. The cycle is divided; one hour purge at 350°F, heat to 775°F in seven hours maximum, cool to 350°F in four hours.

When coil size increases to 11,000 pounds, cycle time totals 19 hours. Heating of the large coils takes ten hours at 775°F. Coil temperature uniformity is held at plus or minus 10°F. Sheet gauge varies from .006 to .125 inch.

For Temper Annealing . . .

For temper annealing, the cycle is considerably shorter. Purging for a 30,000-pound load takes an hour. Burners start up when the oven atmosphere has an oxygen content of 2 per cent. Attainment of temperature requires three to five hours, and is followed by a one hour soak. Then the load is cooled to 350°F.

The cooling system for each oven is a completely external unit with supply and return ducts to the oven chamber. A 15,000 cfm fan pulls the atmosphere from the oven, passes it over fin type water cooling coils and returns it to the supply duct atop the oven.

All external ductwork is welded gas tight and provided with 8-inch insulation on the inside next to the interior ductwork. Interior ductwork is free to expand within the insulation.

Designed by W. S. Rockwell Co., Fairfield, Conn., the oxygen-free ovens are of the hot car type, single end and gas tight. They accommodate a single 11 x 12 foot tray with a 72-inch load for annealing, temper annealing or stabilizing of non-heat treatable alloys. Ovens are constructed for possible relocation within the plant, with the oven floor resting on structural steel beams. Off-the-floor construction also minimizes condensation corrosion under the oven.

In the motor operated, vertical lift type doors, a gas-tight seal is provided by a pneumatic locking device which bears against the reinforced sides of the door, wedging it tightly against the oven seal. The seals themselves are water cooled sponge rubber shapes mounted in the oven shell.

Heating is provided by eight 6-inch diameter radiant tubes, mounted horizontally along the side walls of the oven. For lower temperature annealing cycles an additional set-point on the temperature control instruments turns off part of the burners to prevent overshoot.

To provide the 10-degree control of temperature within each oven, four axial flow stainless steel recirculating fans are located on top. The 20-hp fans are rated at 30,000 cfm each for operation up to 1250°F.

The fans draw the oven atmosphere across the radiant tube section where it is reheated and discharge it into a central plenum above the load. Fans are equipped with an egg crate and cone type diffusers to straighten the discharge and direct it uniformly.

Dividing the radiant tubes from the work chamber is a 16-gauge stainless steel baffle filled with one inch of block insulation to minimize direct radiation from the tubes of the work chamber. The oven shell itself consists of 3/16-inch steel shell, bolted and welded to make the unit gas-tight, plus an inner shell of 16-gauge stainless panels with 4-inch block and 4-inch sulfur-free Spintex insulation between.

Operation of the oven line is handled by one man. The coiled sheet is loaded on an 11 x 12 foot tray which is carried by a tray grab and overhead crane onto each oven car. The trays are made from a non-welded subway grating suitable for the maximum load of 44,000 pounds, covering a structural steel frame.

Trays have only two longitudinal structural members since the crane lift is a basket type grab. Once loaded on the car, the load is pushed into and pulled from the oven by an industrial tractor, operated by the oven tender.

Bridgeport began operations in the Warren plant last October. Equipment installation started the previous June. Besides the rolling mill operation the plant is equipped with painted aluminum strip facilities. The mill is currently providing sheet in 11 alloys.

In addition to the Warren plant, Bridgeport Brass operates an aluminum sheet facility at Riverside, Calif., which also is being expanded.

Each oven is controlled from single panel which includes atmosphere analysis recording controller for each atmosphere generator, oven oxygen recording analyzer, 4-point load temperature recording controller, load soak timer, and oven temperature recorder controller.

■ *Uninterrupted lines of Regent aluminum shingles impart new look to roof. It's latest product to be marketed by CGP.*

BUILDING PRODUCTS FIRM EXPANDS PLANT, PRODUCT LINES

The fact that Consolidated General Products of Houston casts and rolls its own sheet doubtless explains the firm's stepped up activity in aluminum fabricating and roll coating. Flexibilty in re-rolling is another advantage.

Consolidated General Products, Inc., Houston, Texas, has completed a major plant expansion and is now the largest independent aluminum sheet rolling facility in the Southwest. Coincident with this new stature is a substantial degree of integration which promises to accelerate the firm's new product development.

Currently, Consolidated General is going all-out in the production and distribution of aluminum residential siding. Report is that this product, the Rexalum and Rexalum Imperial lines of bake-enameled lap siding, consumes close to 80% of Consolidated's total aluminum sheet production. However, venetian blinds, awnings, a unique roof shingle, and coated and bare coiled sheet also make their demands on the monthly rolling schedule.

It's a far cry from the small company that was organized in 1928 to make wood venetian blinds. While wood and steel products still account for a good percentage of its income, Consolidated is firmly based in the aluminum industry.

The key to the company's integrated status is continuous casting of sheet, wherein re-roll sheet is produced directly from molten aluminum rather than by the longer and costlier hot breakdown process. Using two continuous sheet casters built by Hunter Engineering Co., Riverside, Calif., and three cold mills, Consolidated produces all the coiled sheet it needs for its own fabricated products and enough besides to run through its paint lines to sell to users of coated coil.

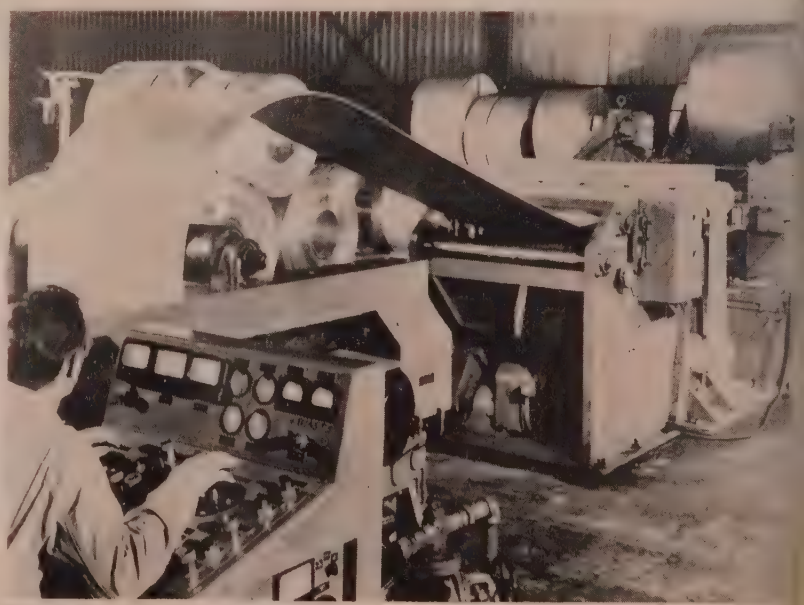
"We feel that these new facilities will enable us to enjoy an expanding role in the manufacture of aluminum products for distribution throughout the U.S.," said Edward C. James, president of Consolidated General.

Back to Ingot

Whereas purchased re-roll sheet was once the company's raw material, it now buys aluminum ingot (5005 and building sheet alloy) in 750 and 1000-pound sizes. The metal is melted in a 10,000-pound capacity, gas-fired reverberatory furnace designed and built by Hunter Engineering.

The molten metal is then passed t a tap-out box in each casting machin The molten bath of the tap-out box slightly above the center line of th casting rolls of the machine. In seekin its own level, the metal passes u through a spreader and is distribute evenly along the width of the rolls.

Because the flowing metal is co stantly under hydrostatic pressur there is a steady passage of fluid met to the "freezing" zone slightly belo the "bite" of the rolls. The rolls, wat cooled to absorb heat of fusion, al mold the hardening metal, grip it, an



■ *Consolidated General Products operates two Hunter continuous sheet casters, one which is shown in action. Aluminum sheet is issuing from water-cooled rolls at l of picture and is looping down to the leveler and edge miller. It was molten me only a minute or so before this.*

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- FINISHING OF ALUMINUM
- PAINTING OF METAL
- STRIPPING OF ORGANIC FINISHES

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INTERLOX PROCESS—for cleaning and phosphatizing prior to organic finishing.

SPRA-LUBE—for controlling over-spray of paints in water-wash, paint-spray booths.

PAINT STRIPPERS—to meet your specific needs.

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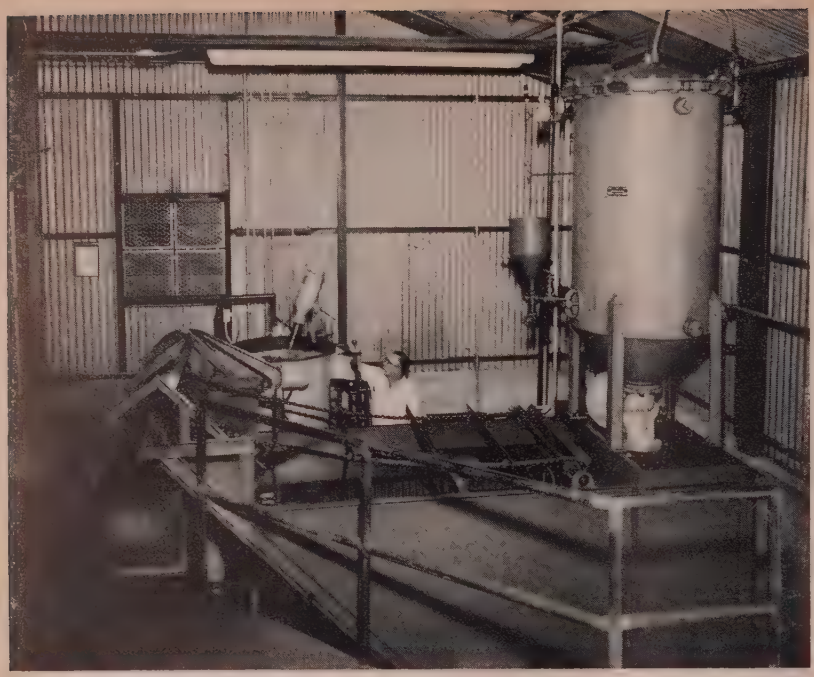


View of Consolidated General Products' Infilco filtering system for the cold mill's rolling oil. About 300 gallons of cleaned oil are pumped to the rolls every minute.

move the newly formed sheet upward at a rate synchronized to solidification speed.

After this, the sheet loops down to a leveler, passes through an edge miller and is coiled. Consolidated produces a 4000-pound coil of 32-inch wide, .250-inch thick aluminum sheet on each machine each hour. The company casts about 15 million pounds of aluminum sheet annually.

Re-Roll Sheet Is . . .

Coils of cast sheet are then passed through a Hunter 34-inch, 4-hi, single stand cold rolling mill which reduces metal thickness to .050-inch. Two 2000-pound coils are produced from the one heavier coil.

An important feature of this mill is the rolling oil filtering system. The lubricant is held in a 3000-gallon reservoir and pumped to the cold mill at a rate of about 300 gallons a minute. After the oil is used, it passes to a sump from which it is pumped through a filter of diatamaceous earth.

The clean oil then flows to a clean oil sump. Before the clean oil re-enters the system it is pumped through a heat exchanger which keeps it between 70° and 85° F. This continuous, automatic filtering system was installed by Gale Separator Div'n of Infilco Inc., Tucson, Ariz.

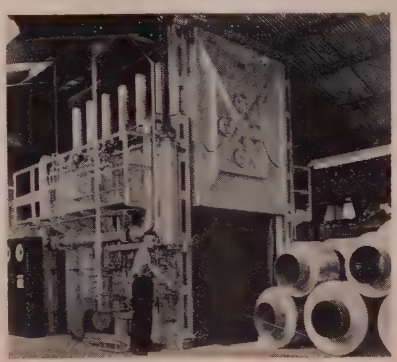
Infilco Inc. now reports that they have developed a system for clarification of the emulsified oil and water coolants used in hot rolling operations. They say two knotty problems are solved by use of the new system: Far less frequent dumping of the spent coolant, and easier disposal of the batch by reason of the unique treatment to which the material is subjected.

To Restore Physicals . . .

After this first pass, the .050-inch coils are annealed in a furnace built by Natural Gas Equipment, Inc., Pasadena, Calif., then passed through a 20-inch, 4-hi Steckel mill made by Cold Metal Products Co. (no longer in existence) for further reduction.

Consolidated also uses a 6-inch, 8-stand continuous mill for rolling aluminum up to 4 inches wide in one continuous pass. This is a Lewis mill, built by the Blaw-Knox Co., Blawnox, Pa. The range of metal thicknesses rolled by Consolidated General Products is from .050-inch down to .005-inch.

The company also operates 11 roll coating lines for painting strip from venetian blind widths up to 18 inches wide. Actually, some of these are multiple lines in which two or more narrow widths run through the same Alodine 1200S pretreatment bath, are coated simultaneously by the same roll coater, and are then bake hardened in a common oven. Most of the coating line equipment was supplied by Gasway Corp., Chicago.



Aluminum coils are annealed in this Natural Gas Equipment Corp. annealing furnace prior to further reduction in thickness from .050-inch.

After estimating that total roll coating capacity at Consolidated is close to 2 million pounds of strip per month James termed it a "giant step forward" that would enable Consolidated to meet the "enormous demand for painted strip," not only in the fast developing Southwest but throughout the U.S. as well.

With a variety of lucrative markets in its sights, the company produces pre-enameled coiled strip in widths from ½-inch to 18 inches and in thicknesses from .005 to .051-inch. Colors, James said, are supplied to customers' specs.

Some of the coating schedule is devoted to Consolidated's new Regency line of long shingles. This type of roof covering is said to reduce installation costs because fewer shingles are needed for a roofing job, and because of its fast interlocking design. The Regency shingle is 10 feet long, 12 inches wide and .025-inch thick. Its length gives "a fresh new look" to a roof.

Wide Color Range

The new shingles are made in six baked enamel colors; also striated and wood grain designs. All aluminum to be painted is conversion coated with Alodine 1200S, the pre-paint system supplied by Amchem Products, Inc., Ambler, Pa.

Alodine 1200S is a chromate conversion coating applied to the coil by continuous spraying. This treatment offers a high degree of corrosion protection to the aluminum while affording a proper bonding surface for the paint.

It wasn't until 1946 that Consolidated General introduced a new product—basswood porch shades. In 1950, however, the company entered the metal working field when it began manufacturing attic fans.

"Both lines are still an important part of our volume," James reports.

In 1953, Consolidated bought Aeroshade Co., Waukesha, Wis., a firm that had been making basswood shades and other woven wood products since 1919. It also began to make steel skylights and an overdrive.

Consolidated's main factory is at 2nd and Nicholson, in Houston; branch factories and warehouses are located in New Orleans, Atlanta, Dallas, Tampa, Waukesha, and Saddlebrook, N. J.

How Empire-Reeves gets better quality silicon steels, faster

Lee Wilson open coil annealing improves uniformity, facilitates delivery, reduces inventory at Empire-Reeves

"Improved customer service," reports Donald W. Frease, President of Empire-Reeves Steel Corporation," is just one of the assets the addition of the Lee Wilson Open Coil Annealing has given Empire."

"We can now process orders with much greater speed," he continues, "yet we can reduce our inventory in the annealing department, because—by opening the coil—hot gases can saturate the entire coil in a fraction of the time previously required. Cool-down is just as efficient.

"The quality of our silicon steels, as well as others processed through the Open Coil system, is vastly improved because the heat quickly reaches every square inch of the surface of the steel coil. This means it receives a perfectly uniform anneal with an absolute minimum of hardness variation. Because we are handling individual coils instead of continuous strip we have wonderful flexibility. We can process short orders as easily as long runs.

"The Lee Wilson Open Coil Process thus enables us to improve our customer service and our product, and at the same time, gives us the most efficient annealing system available today," Mr. Frease, concludes.

If a better product or more efficient annealing department appeals to you, why not get the last word on annealing practice. The Lee Wilson sales engineer in your area will be happy to meet with you at your convenience.

Donald W. Frease, President of Empire-Reeves Steel Corporation (center), tells J. L. Whitten, Vice President of Sales of Lee Wilson (right), and E. G. Fenton of Empire, the results of Open Coil Annealing at Empire after the first few months of operation.

Overall view of the Lee Wilson Open Coil Annealing installation at Empire-Reeves' Mansfield, Ohio, plant.

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MAKE THE BEST METALS BETTER

* ORIGINATORS AND LEADING PRODUCERS OF OPEN COIL AND SINGLE STACK FURNACES

Self-Emptying Trailer

Hauls 12 Tons of Grain

Extensive use of aluminum extrusions, sheet and castings holds weight of British-built carrier to slightly over a ton, not including concealed screw-type discharge system.

ANOTHER example of aluminum in the construction of large bulk carriers in order to gain greater payloads through reduced dead weight is the handsomely finished grain trailer shown here. It was built in Britain by H. Woodward & Son Limited for Henry Shutt Limited, a firm of corn millers in Lancashire County. Among the trailer's important features is an efficient screw discharge system.

Hidden Hoppered Floor

The body itself is 26 feet 8½ inches long, is 7 feet 6 inches wide, and has a capacity of over 600 cubic feet. Overall height is 8 feet 11 inches. A hoppered floor slopes at approximately 27½ degrees down to the longitudinal center line of the trailer, but an external rectangular appearance is achieved by extending the sides of the vehicle below the floor level.

The aluminum sheet, extrusions and castings used in the truck were supplied by Alcan Industries Limited (previously Northern Aluminium Co. Limited).

Cast underframe pedestals (Noral alloy 117) resting on timber packing are attached to the main chassis members and support standard channel section cross bearers. These pierce the hoppered floor, which, with the sides, is made of aluminum sheet.

The floor is supported by angled aluminum sections which are bolted to the cross bearers and to the vertical side pillars. The latter are also bolted to the cross bearers. The extruded channel and angle sections are of Noral B51S alloy (AA 6351).

Good Pay Load

Six channel section roof sticks brace the sides and, with two longitudinal stringers, support the weather sheet which is fastened to cast aluminum rope cleats. The body, excluding the discharge system, weighs only 2350 pounds, but carries 12 tons of grain.

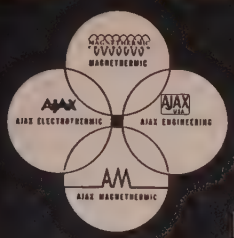
The discharge screw conveyor runs
length of the trailer in a semi-circu
channel section set at the apex of
floor and supported from the c
bearers. The four bearings for the sc
are also suspended from the cross b
ers. A 5 hp electric motor which pow
the screw through a chain drive is s
ated beneath the hoppered floor an
accessible through a hinged door in
bowed front.

Fast Unloading

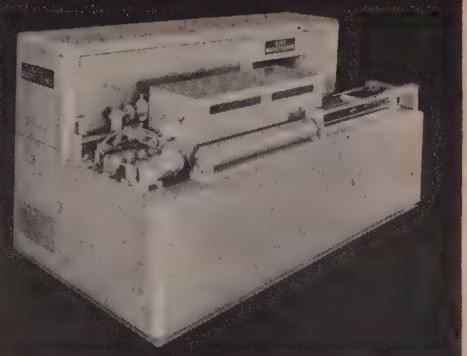
Overloading of the motor is preven
by taking the weight of the load
pitched panels over the screw. T
have a 1½ inch clearance from
floor for grain feed and are hinged
allow inspection of the screw. A
load is discharged by this system throu
a rear orifice, in 20 minutes. About
tons of the load can be diverted throu
a side-outlet gravity discharge.

The trailer is finished in red, the
tering being gold with black shadi

■ *The 25-foot semi-trailer's 600 cubic foot capacity has a 12-ton payload by reason of its aluminum construction. Interior view of the big hopper shows the hooded screw conveyor used for discharging the load; the hood protects the screw against full weight of the material.*



TAPER HEATING... ONE OF MANY WAYS BILLET HEATING BY INDUCTION INCREASES PRODUCTION OF EXTRUSIONS



WATCH AM

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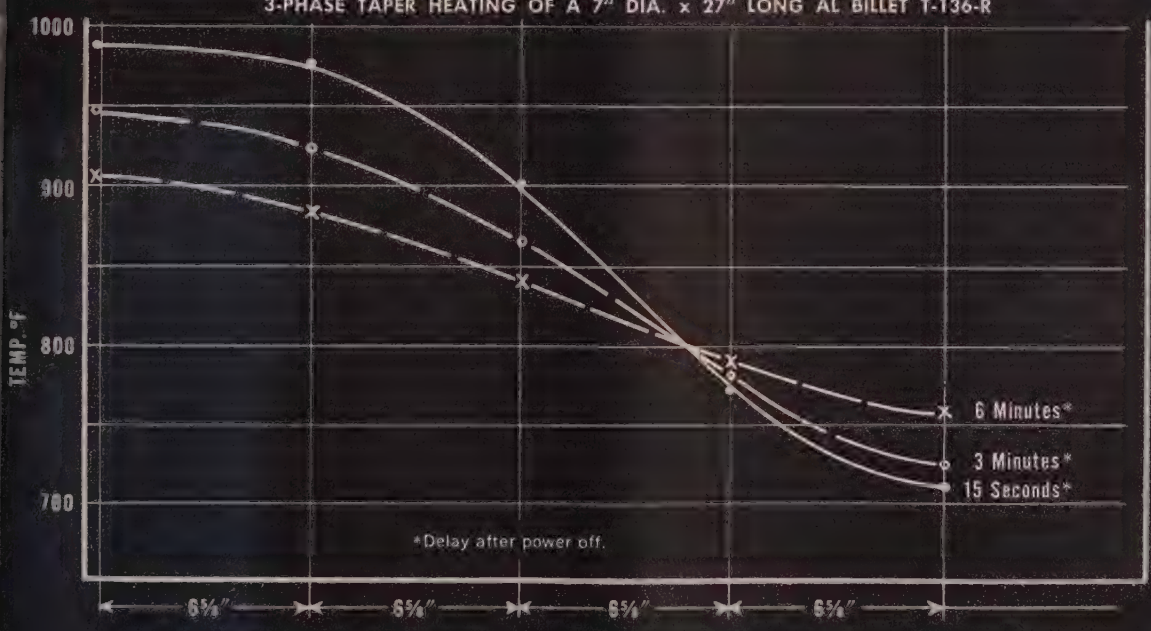


Here is the result of an actual test performed in our Youngstown Laboratory. Purpose — To demonstrate that the Tapered Pattern within an aluminum billet diminishes only slightly after power off.

HOW TO CONTROL
The Aluminum Bright Dipping Process

Uniform, high quality brightening of aluminum in the chemical bright dipping process depends largely on thorough control of bath composition and other variables. Most control techniques depend on operator skill or time-consuming chemical analysis. Monsanto's new electronic monitor constantly checks nitric acid content of the bath, permitting continuous composition control.

by G. D. Nelson and C. J. Knapp
Inorganic Chemicals Division, Monsanto Chemical Co., St. Louis, Mo.

CHEMICAL polishing has gained favor in recent years as a means of obtaining a specular finish on aluminum, and has almost completely replaced the electropolishing processes. Primary reasons for this are the small capital outlay required for a chemical polishing operation compared to that needed for an electropolishing installation, and the increased use of aluminum in a great many applications because of it corrosion resistance.

The use of chemically polished aluminum has been widely adopted by the automotive and appliance industries and for specialty items such as kitchenware, furniture trim, lawn furniture, and similar items. The finish compares favorably with the luster finish obtained by electropolishing.

The brightness of a chemically polished surface is protected, without loss in specularity, by a thin anodized film. This film may also be dyed with a wide variety of colors to simulate such metals as brass, copper and gold.

Bright Dipping Is . . .

The process for producing the chemically polished finish is known as bright dipping. It consists of immersing fabricated, pre-cleaned aluminum articles in an acid bath held at an elevated temperature. Chemical action of the bath levels surface irregularities, thereby producing a specular finish.

While several types of chemical baths have been used, the industry has generally adopted a phosphoric acid-nitric acid composition as the best bath from the standpoints of performance and cost. This bath, when freshly prepared, consists of approximately 95 parts by volume of 85% phosphoric acid and 5 parts of 67% nitric acid (described in U. S. Patent 2,729,551), plus minor additives in trace quantities.

After the bath has been used for bright dipping, it also contains dissolved aluminum and water from chemical reaction. The exact amount of these components will vary from one operation to another, depending on the rate at which aluminum is dissolved, the rate at which bath solution is dragged out on the work, the rate of evaporation of water, and control limits placed on the operation.

To obtain work of consistently high quality at minimum acid consumption it is necessary to maintain the chemical composition of the bath liquor — phosphoric acid, nitric acid, water, and dissolved aluminum — within narrow limits. This requirement has presented a considerable operating problem in the past.

The only available methods of control have depended either on operator observation and judgment — which is often unreliable—or on tedious chemical analysis, which is time-consuming and expensive and causes a delay of several hours between sampling and bath correction.

This discussion covers the requirements for the reliable and economical operation of phosphoric acid-nitric acid bright dip baths for aluminum, and briefly describes a new method for bath analysis and control developed by Monsanto Chemical Co. This method has been adopted in a number of plants and has been found to be superior to previous practices. It is rapid, reliable, inexpensive and simple enough to be used by plant personnel, if desired.

The bright dipping process for aluminum consists basically of four steps: cleaning, bright dipping, anodizing, and sealing. If coloring of the aluminum surface is desired, a dyeing operation is performed between anodizing and sealing. Rinsing between steps prevents contamination of the baths.

Uniform production of high quality work requires that controls be maintained over the critical operating variables in these steps before and after bright dipping, as well as in the brightening bath itself. Thus, a consideration of the process steps, the important variables affecting quality, and the economics of the operation should precede a discussion of the bright dip bath and the new control procedures.

The choice of alloy depends mainly on the use for which the aluminum piece has been designed. Low strength, high purity, general purpose aluminum (1100 series), the high strength coil stamping alloys (5357, 5457 and 5554) and the extrusion alloys (6061, 6063, 6463) all respond well to chemical brightening in the phosphoric-nitric acid baths. Cast aluminum — and high silicon alloys in particular — are not suitable for chemical brightening.

Complete Cleaning Essential

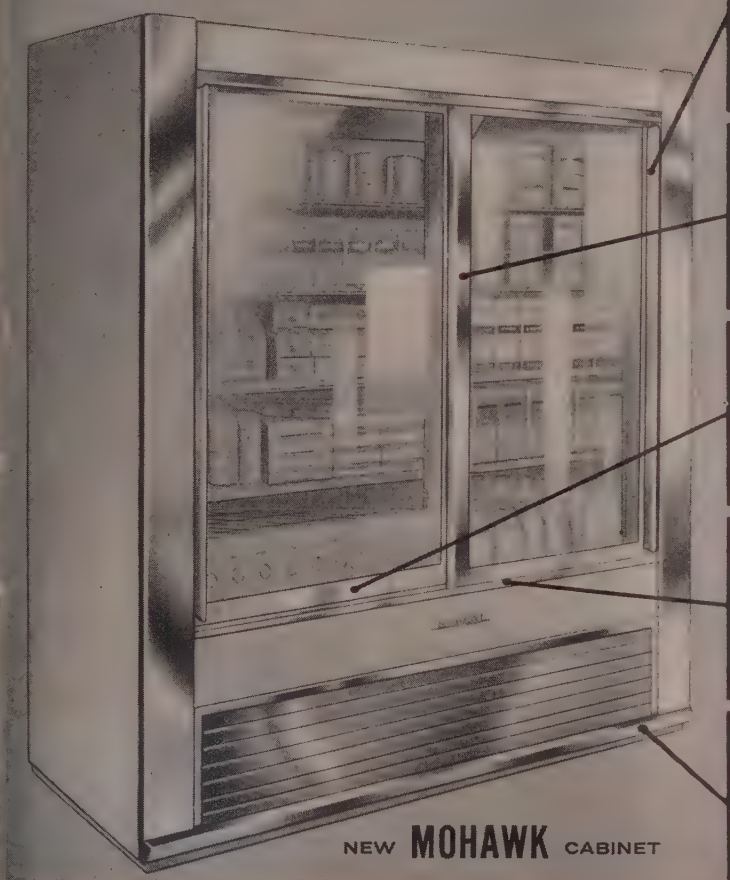
The importance of cleaning the metal prior to finishing cannot be overemphasized. If a cleaning cycle is not performing properly, it can affect the functions of all subsequent operations. Improper cleaning can be responsible for a large percentage of rejects from the bright dipping operation.

The function of rinsing is twofold: To remove the chemicals used in the bath preceding the rinse to prevent them from drying on the metal surface and staining it; and to prevent contamination of one bath by another.

One rinse should never serve more

DESIGNING A NEW PRODUCT?

ask Superior about its money-saving aluminum extrusions

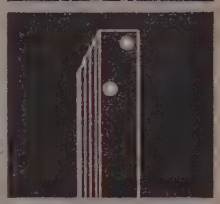


CABINET DOOR HANDLE

Extrusion includes rubber bumper adapter; mitered ends; drilled, countersunk, drilled and thread-tapped holes.

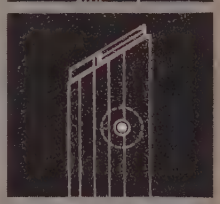
DOOR SLIDE RAIL

45° mitered, drilled, countersunk, polished, chemically brightened and anodized.



BOTTOM DOOR RAIL

(This section holds a nylon roller wheel.) Mitered, drilled, countersunk and precision thread tapped.

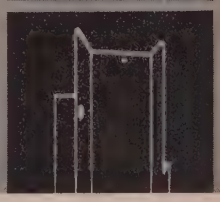


BOTTOM TRACK RAIL

Mitered, milled contours, drilled, countersunk, polished and anodized.

KICK RAIL

Notched, punched, polished, chemically brightened and anodized.



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than one operation; drag-in chemicals from two different baths may form undesirable precipitates. Draining of rinse water is highly important for the rinse preceding brightening, since control of water in the brightening bath is critical in obtaining satisfactory brightening.

Since performance of chemical brightening baths is extremely sensitive to changes in the numerous operating variables, control of these variables is mandatory for satisfactory brightening and economic operation. The operating variables for the bright dip bath are listed in Table 1, along with recommended operating conditions for optimum quality brightening and economic operation (except in certain specialized operating situations not covered in this paper).

Agitate Bath Because . . .

Agitation of bath and/or work is important to make sure that make-up solutions (H_3PO_4, HNO_3, and possibly water) are well dispersed in the bath and that there is no depletion of acidity at the work surface.

Drain time should not exceed 30 seconds, but should be the maximum consistent with good quality, since from an economic viewpoint it is desirable to drag out as little acid from the brightening bath as possible.

The surface of freshly bright dipped aluminum is chemically active and will react readily with air or almost anything else which it contacts. Thus the surface must be protected with a uniform, transparent coating almost immediately after bright dipping if the uniformly bright appearance is to be preserved. Protection is usually accomplished by anodizing in a sulfuric acid bath. Other anodizing bath compositions or careful drying followed by a coat of lacquer is sometimes used.

Anodizing; Dyeing; Sealing

The anodizing operation forms a very thin, non-conducting, corrosion and wear resistant coating of aluminum oxide which is an excellent base for absorbing various dyes. Since the anodizing step takes longer than any of those preceding it, this is the rate-setting step in any bright dipping operation.

The function of the dyeing operation is to color the surface of the aluminum with a uniform, permanent, light-fast color. Uniformity of color depends largely on the cleaning operation. A spot of grease or dirt left on the metal surface will prevent brightening and the deposition of the anodized film.

The color intensity obtained from a given dyestuff depends on the amount of dye absorbed by the anodized surface. Darker hues require greater dye absorption which can be obtained from greater thicknesses of the anodized coating. Thus control of the anodizing step is critical to the dyeing step since the requirement for anodized film thickness varies with the color desired but m be maintained at a given thickness a porosity to reproduce given colors fr one batch of work to another.

Absorption of the dye can also pend on the pH and temperature of dyebath, as well as immersion tim All of these factors should be clos controlled when reproducibility of co is of prime importance.

The function of the sealing operati is to fill in the pore spaces in the a dized coating, thus sealing it agai attack from outside forces. In the se ing process water combines chemica with the anodized coating, forming hydrated aluminum oxide which pands, thus sealing off the pores. Wh the aluminum pieces have been dy sealing prevents leaching of the dye a provides corrosion resistance.

If brightening is carried out w little or no regard for control of op ating variables, the work quality w show a high degree of variation a reject costs will be high. Further, si the brightening operation represe about 75% of the total chemical c involved in the production of a finish brightened piece, lack of control o those variables affecting raw mate consumption can lead to excessive bri dipping costs.

The variables affecting the bri dipping operation can be considered two categories: operational, and ch ical. Recommendations for control operational variables are presented Table 1.

Bright Dip Bath Contains . . .

Although there are a number theoretically acceptable ways to descr the chemical composition of phospho nitric acid bright dip baths for alu num, it is preferable to consider suc bath as consisting entirely of four ma components and to express the conc tration of each in terms of weight cent. The four components are: F nitric acid (HNO_3); free phosporic a (H_3PO_4); water (H_2O); and alumin phosphate ($AlPO_4$). This system is u exclusively in this article.

The principal advantage of method is that the sum of the con tration of the four components adds to 100%. (This is not true with the tem commonly in use, in which ni and phosphoric acids are expressed volume per cent and aluminum con in grams per liter. Conversion betw the two systems can be made by m plying the weight per cent $AlPO_4$ b factor of 3.9.)

Although it is theoretically incor to ignore minor bath additives and purities, these components are pre in such small amounts that the resul error is of no practical significa However, if a fifth major compo

Table 1 – Operating Variables and Recommended Controls for Aluminum Bright Dipping Baths

Operating Variables	Recommended Operating Condition	Method of Control
Bath temperature	190-210°F.	Regulation of heat supply, preferably by automatic control.
Bath composition	See Table 3 and Figure 1.	See Table 3 and Figure 1 for detailed recommendations.
Bath agitation	Stirring by air or mechanical mixer (in some cases movement of work in the bath is adequate).	Maintain sufficient agitation to provide thorough mixing of the bath.
Work agitation	Gentle movement of work while immersed in bath.	Maintain sufficient movement to prevent depletion of bath liquid at work surface.
Work immersion time	1.0-3.0 minutes	Regulate manually or by automatic timer as required to produce high luster.
Work drain time	30 seconds maximum	Regulate manually or by automatic timer as required to minimize drag-out without causing staining or inadequate rinsing.

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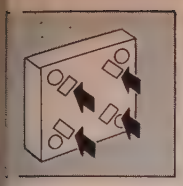
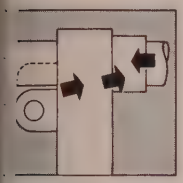
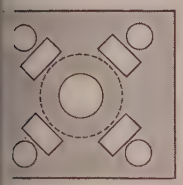


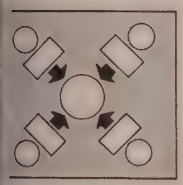
1. Each corner link is a strong, self-contained support for both plate and die.



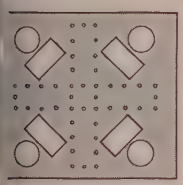
2. Short and direct transfer of loads on each corner minimizes bending stresses on the moving die platen and back plate.



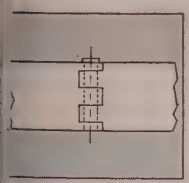
3. Reduces the area of unsupported moving die plate. Helps eliminate flashing and potential cracking of dies.



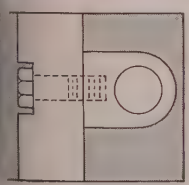
4. Prevents weaving of the link center axis (crosshead) and consequent unequal loading.



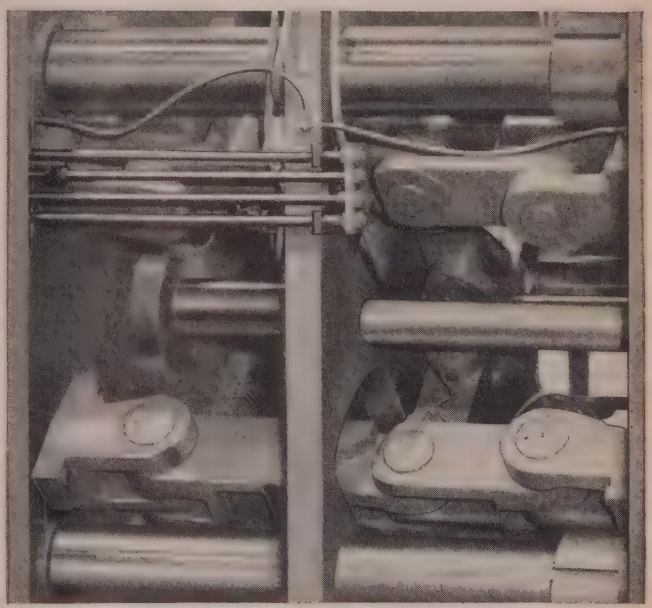
5. Permits a large area of both horizontal and vertical bumper pin ejection pattern.



6. Corner positioning of each link assembly results in equal and straight line loading of all pins and bearings in the link pivots.



7. Toggle anchors are bolted to the back and traveling platens. They are not subject to weld breaks or breakage as part of a casting.



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such as sulfuric or acetic acid is added to the bath, it must be taken into account. (Such baths are not discussed herein, although the information presented is applicable, with proper modification, to allow for the presence of the fifth major component.)

The concentration of these major components in any bath depends on rates of addition and removal, which in turn are dependent on the many operational variables. The various means by which these components are added or removed are given in Table 2.

Equilibrium Occurs When . . .

When the amount of the component being introduced balances the amount leaving the bath, the bath has reached equilibrium. The equilibrium level for nitric acid and phosphoric acid can be easily varied by the rate of addition of these components to the bath.

Water and aluminum phosphate, however, are more dependent on other operational variables, hence are a function of the particular bright-dipping operation. (In some circumstances it may be necessary to regulate these components at a level other than the natural equilibrium level resulting from the combination of operational variables, so that bath performance is acceptable.)

Control of the composition of the phosphoric-nitric acid bath is necessary to maintain consistent high quality work. The effect of composition on brightening performance of baths operated in the range of 190-210°F and containing 2.5 to 3.5% nitric acid and 0.01-0.02% copper, is shown in Figure 1. This chart is the result of an extensive laboratory study and has been confirmed in operating baths.

The temperature range chosen is typical of that found in the industry. A level of 3% nitric acid will give optimum results with the commonly used alloys. The 0.01-0.02% copper improves quality significantly over baths in which no copper is present, and therefore is considered an important requirement of a bright dip bath. In laboratory work to date, no advantage has been observed from partial or complete substitution of copper with other metals.

From Figure 1 it can be seen that there is a relatively small area of composition which gives high quality work. If high quality is desired consistently, the composition of the bath must be controlled to keep it in this area. While high quality is obtained anywhere in this range, minimum raw material co is obtained only when the bath is ope ated at a composition near the top this range (10-12% $AlPO_4$).

The optimum bath composition f high quality at minimum raw materi costs is given in Table 3, along wit the recommended means for control each variable. If operating conditio are such that this high level of AlP cannot be reached, minimum raw m terial costs for the particular operatio will be at the equilibrium $AlPO_4$ leve If this level is low, those operatin variables affecting the $AlPO_4$ level the bath should be considered to dete mine if this level can be increased.

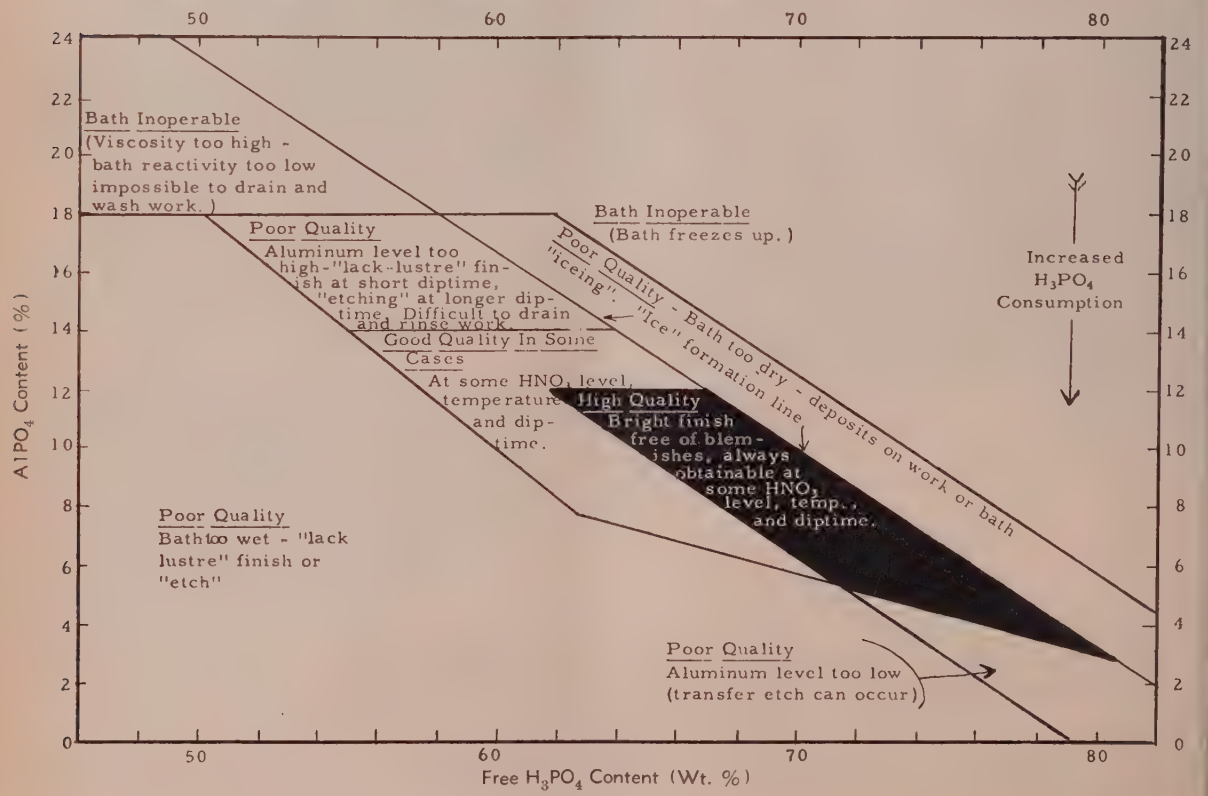
Composition Control Vital

Many operations start with a fre bath and use it until either the wo quality is unacceptable or the bath ic at which time the old bath is discard and a fresh one prepared. It is obvio from the foregoing discussion and Fi ure 1 that this operation will not le to consistent quality or minimum ra material costs.

These objectives are achieved on through continuous control of the ba composition within the limits of t optimum operating range shown.

To keep the composition of the ba

Fig. 1: EFFECT OF BATH COMPOSITION ON PERFORMANCE OF ALUMINUM BRIGHT DIPPING BATH (for baths operating in range of 190-210°F and containing 2.8-3.2% HNO_3 and 0.01-0.02% Cu in addition to indicated free H_3PO_4 $AlPO_4$ and H_2O levels)



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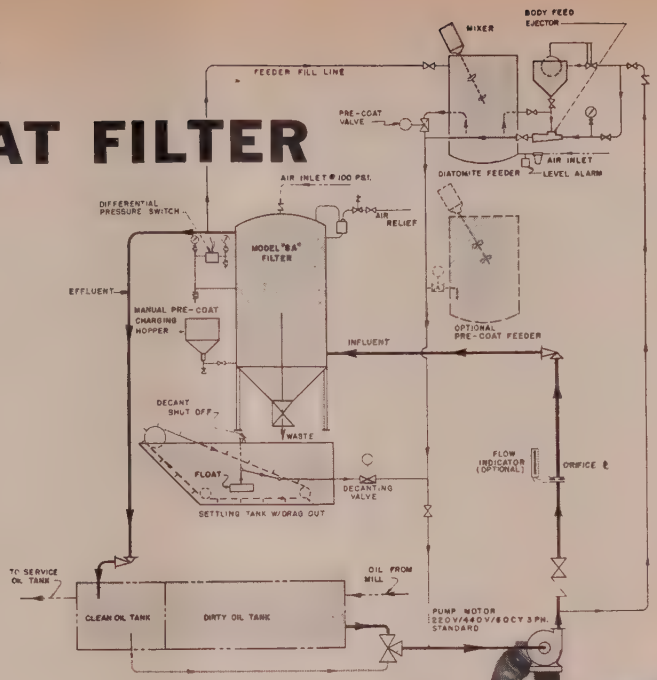

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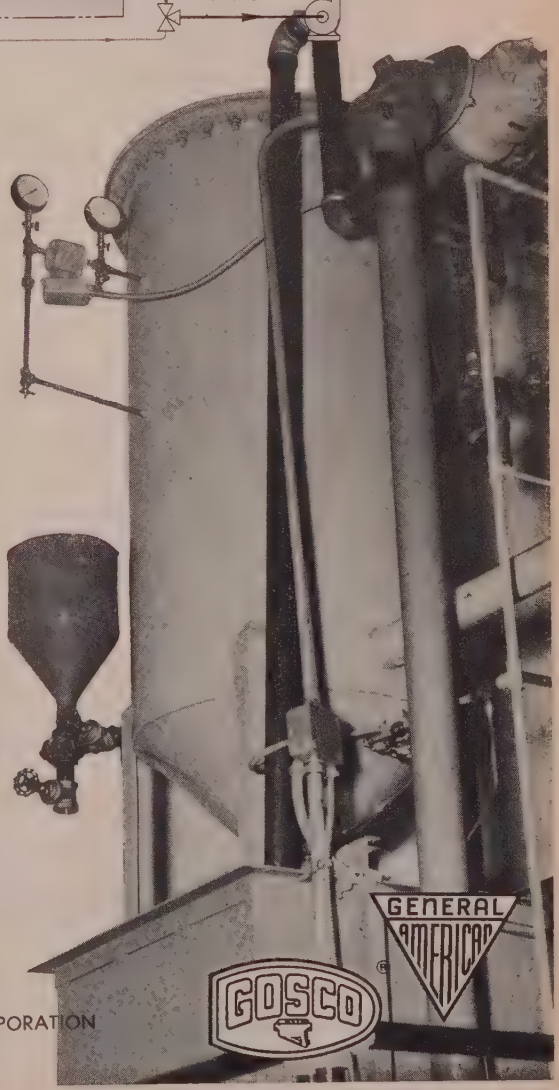

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Table 2 – How Major Components Are Added to and Removed From Phosphoric-Nitric Acid Bright Dip Baths for Aluminum

Bath Component	Introduced Into Bath	Removed From Bath
Free Nitric Acid (HNO_3)	a) Bath make-up with 42° Be nitric acid or proprietary solution	a) Chemical reaction with work b) Evaporation c) Decomposition to fumes d) Drag-out on work pieces e) Periodic removal of bath
Free Phosphoric Acid (H_3PO_4)	a) Bath make-up with phosphoric acid or proprietary solution	a) Chemical reaction with work b) Drag-out on work pieces c) Periodic removal of bath
Water (H_2O)	a) Bath make-up as part of nitric acid, phosphoric acid and/or proprietary solution b) Purposeful additions of water c) Chemical reaction of nitric and phosphoric acid with work d) Decomposition of nitric acid to form fumes e) Carry-over from rinse	a) Evaporation b) Drag-out on work c) Periodic removal of bath
Aluminum Phosphate ($AlPO_4$)	a) Chemical reaction of phosphoric acid with work	a) Drag-out on work b) Periodic removal of bath
Other Bath Additives	a) Bath make-up with phosphoric acid or proprietary solutions	a) Chemical reaction with work b) Drag-out on work c) Periodic removal of bath

Table 3 – Composition Variables and Recommended Control Levels for High Quality Work & Minimum Material Cost in Aluminum Bright Dipping Baths

Composition Variable	Recommended Range For Control	Control Method
Nitric Acid	2.8-3.2%	Additions of 67% HNO_3 as indicated by Monsanto Nitric Acid Meter[1]
Water	17-23%	Additions of 85% H_3PO_4 and/or water as indicated by analysis[1]
Aluminum Phosphate ($AlPO_4$)	10-12%	Decantation of bath if maximum value is exceeded, if bath cannot be controlled below this level by other variables
Phosphoric Acid	64-70%	Additions of 85% H_3PO_4 and/or water as indicated by analysis[1]
Copper	0.01-0.02%	Addition of $CuSO_4.5H_2O$ dissolved in water at rate of 2.5-5.0 grams per gallon of 85% H_3PO_4

[1]Operating variables such as bath agitation and temperature must be regulated to insure a slight loss of water from the bath at all times.

in the optimum operating range — or t correct a bath to a new composition the effect of operational variables o bath composition must be understoo Since nitric acid is consumed rapidly i the bright dipping process, its lev must be controlled by frequent add tions.

The operational variables can be a effective means for controlling the equ librium level of the other three con ponents — $AlPO_4$, H_2O and H_3PO_4. two of these three components are co trolled (and the nitric acid level is fixe then the third one automatically b comes fixed.

Since bath performance usually is r lated to $AlPO_4$ and H_2O, the effect the operational variables is discusse in terms of these two components. Th operational variables which can affe the equilibrium levels of these two co ponents and the direction of their effe are given in Table 4.

Needed: Reliable Analysis

Knowledge of the chemical compos tion of the bright dip bath at any give time is essential if proper adjustmen are to be made to control it within th desired limits. Thus, a practical an reliable method of bath analysis is r quired.

Many operations rely on the skill an judgment of operators, who estima bath additions from the appearance the bath and of the work. While th system may be adequate under routi conditions, it places a high premium c training and often fails in emergen situations.

This can mean periods of poor qua ity work, loss of operating time, and, extreme cases, the necessity to disca the bath or a portion of it and subs tute fresh solution.

In an attempt to overcome the de ciencies of this system, chemical met ods for analysis of various bath co stituents have been employed to supp ment or replace the operator's judgme But these methods are not totally sat factory; they require expensive labo tory facilities and trained analysts, a they may introduce a delay of 2-4 hou between sampling and bath correctio They are also inadequate for prop control of operations in which ba composition changes rapidly with tim

An Electronic Monitor

The Monsanto method for bath an ysis overcomes the deficiencies of t present methods by replacing them wi an electronic meter and two simp physical measurements, specific grav and viscosity.

The method is rapid; the level of t four major components of the bath c be determined within 15 minutes af

ıpling of the bath. No expensive oratory facilities or reagents are re- ired; and the system is simple enough be run by relatively unskilled tech- ians or by operators. Further, it has en shown to give as accurate an anal- s of the bath components as the emical methods.

Monsanto research personnel reasoned at nitric acid control was one key to e problem of maintaining a bright p bath at optimum composition. With tric acid content held constant, alu- num phosphate and phosphoric acid ntents could be measured and added or subtracted from the bath to make eir levels correspond to predetermined otimums. The water content would, in ch a procedure, be automatically con- olled.

ow It Works

To maintain nitric acid control, the onsanto Nitric Acid Meter (patent plied for) was developed. It is an ectronic device (Fig. 2) which con- antly monitors the bath condition and capable of detecting even a slight ange (0.2% by weight) in the nitric id content of the bath. A green light the meter burns as long as a pre- etermined nitric acid level is main- ined. If the nitric acid content falls elow this level, a red light replaces the reen.

When this happens, only a minimum mount of acid is required to bring the ath back to the desired nitric acid ontent. If these minimum corrections re made promptly, the nitric acid will emain at ± 0.2% of the desired level t all times, and can be considered as constant.

When the nitric acid content is determined to be at the desired level, the bath is measured for viscosity and specific gravity. The results of these measurements are then compared to tables prepared under exacting laboratory control procedures by Monsanto research personnel.

This comparison reveals the contents in the bath of aluminum phosphate, phosphoric acid and water. Reference to Fig. 1 will then show the composition of the bath in relation to the recommended operating range.

Chart Each Operation

If desired, a chart can be constructed for any specific operation which will directly relate specific gravity and viscosity of the bath to the amount of phosphoric acid and water necessary to be added to bring the bath composition into the recommended operating range.

Although this may seem complicated at first reading, the procedure is so simplified that neither chemical knowledge nor an expensive laboratory is required. As previously stated, any competent person can perform the measuring and controlling procedures, and baths can be corrected within about 15 minutes after they are measured.

When analyses and suitable corrections are made with reasonable frequency, the required corrections are small and the bath can be held within or near the optimum operating range indefinitely.

This is the prerequisite for good quality at minimum cost.

Table 4 – Effect of Operating Variables On Equilibrium Levels of $AlPO_4$ and H_2O In Bright Dip Baths for Aluminum

Operational Variable	Effect on Equilibrium Level of $AlPO_4$	Effect on Equilibrium Level of H_2O
Temperature of bright-dip bath		
Increase	Increase	Decrease
Decrease	Decrease	Increase
Immersion time		
Increase	Increase	Increase
Decrease	Decrease	Decrease
Air-agitation of bright-dip bath		
Increase	None	Decrease
Decrease	None	Increase
Drain time over rinse tank prior to bright-dipping		
Increase	None	Decrease
Decrease	None	Increase
Drain time over bright-dip tank after brightening		
Increase	Increase	None
Decrease	Decrease	None
Strength of phosphoric acid		
Increase	None	Increase
Decrease	None	Decrease

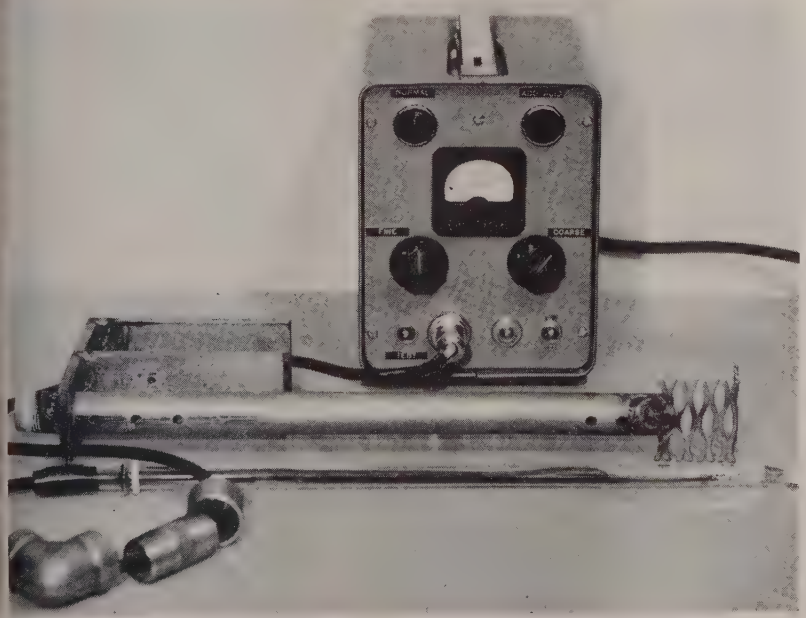
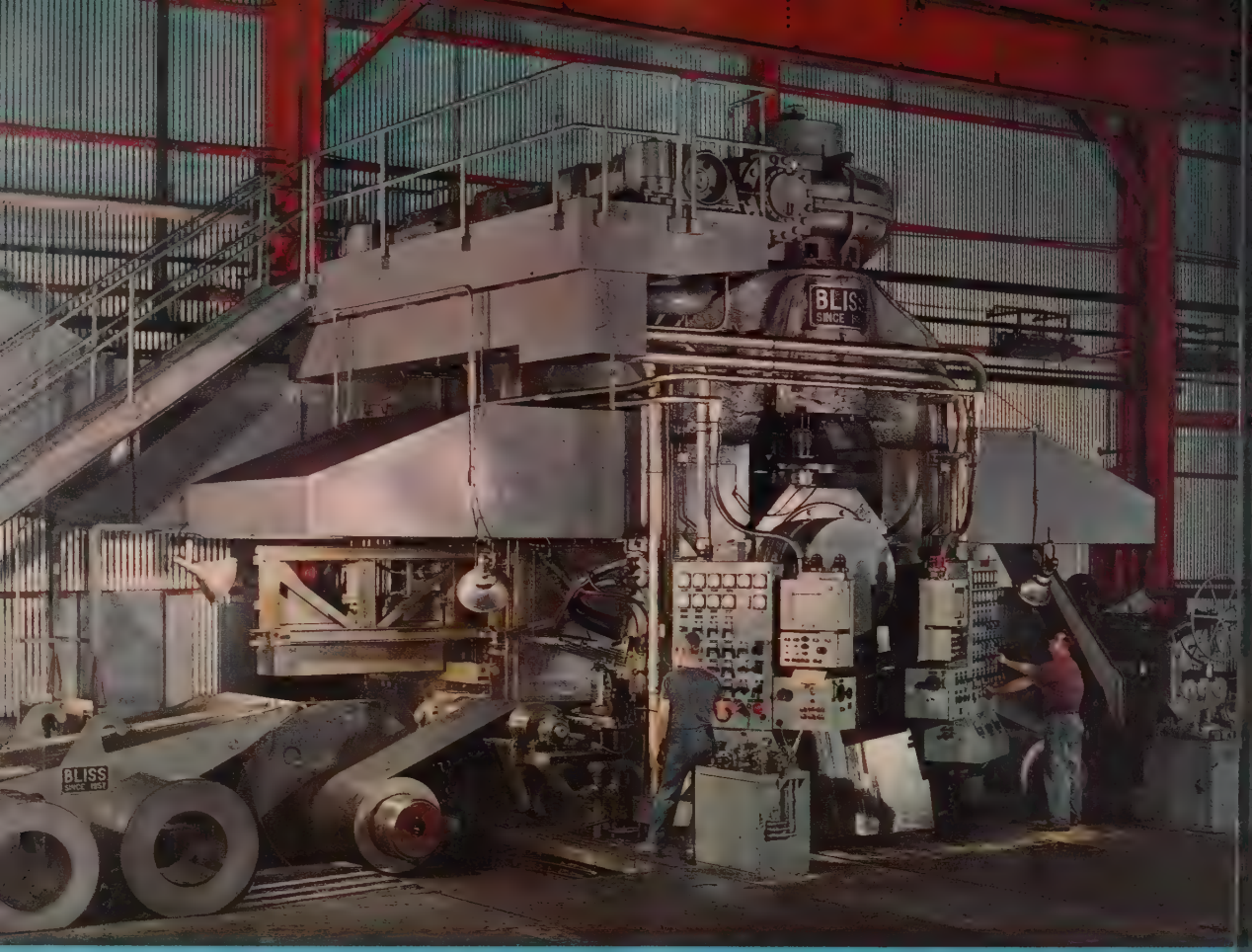


Fig. 2. The Monsanto Nitric Acid Meter, an electronic device that constantly monitors nitric acid content of bright dip baths, simplifying control of composition.



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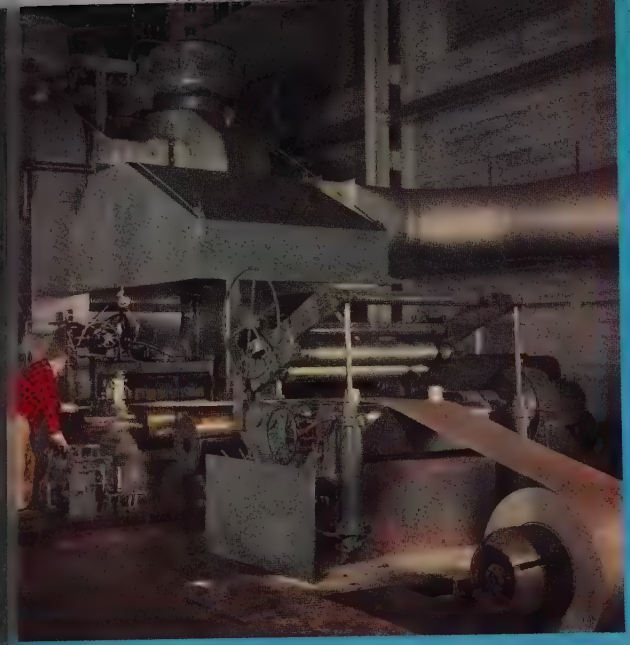

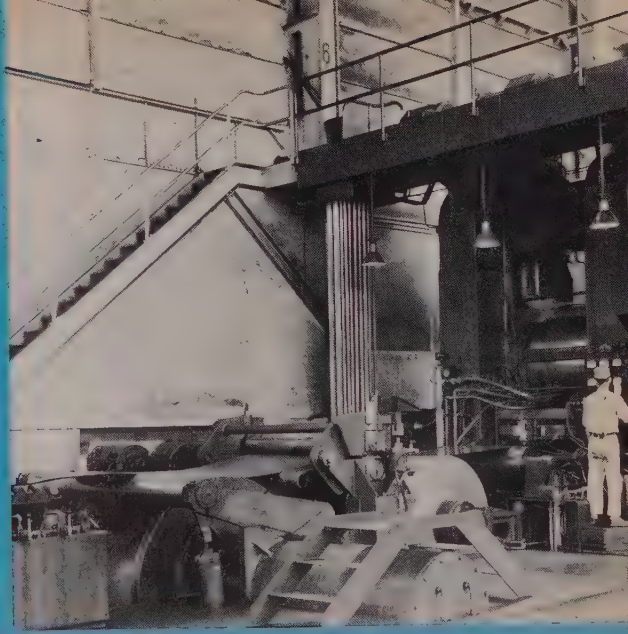

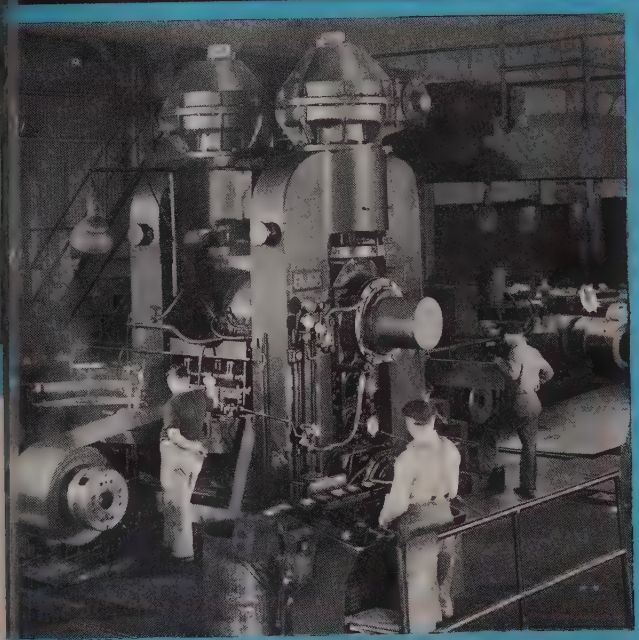

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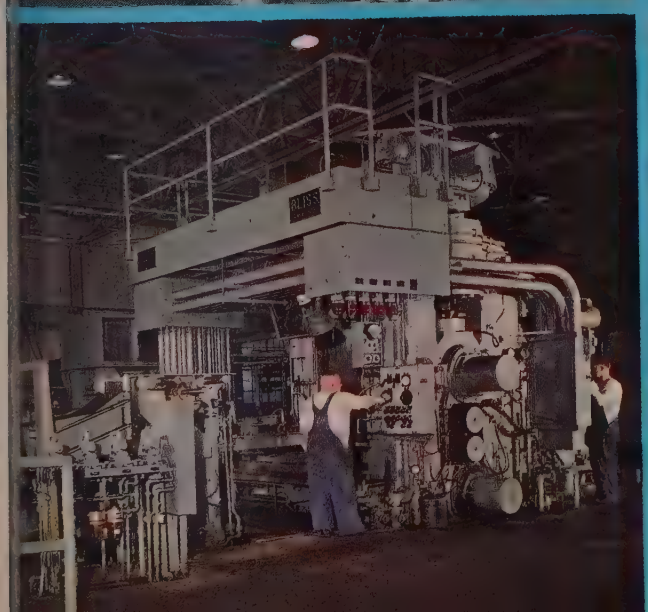
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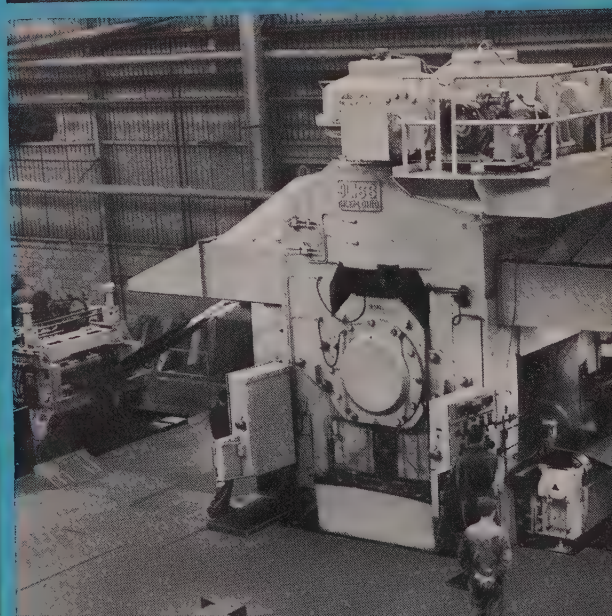

Selecting alloy, temper, finishing process for

ALUMINUM IN AUTOMOTIVE PARTS

The automotive industry consumed 140,000 tons of aluminum during the 1959 model year; is expected to use twice this amount annually by 1965. Selection of proper alloy, temper and processing procedures for such parts as bumpers, wheel covers and body components are covered in this discussion.

by Harry E. Phipps

MORE aluminum will have been used in the production of the nation's automobiles in this model year than ever before. Although the use of aluminum alloys for interior and exterior trim, grilles, brake drums, transmission housings, pistons, etc. remains at a high level, the principal reason for the increased use is the advent of the cast aluminum motor block in Chevrolet's compact, rear-engined Corvair. This application alone can add approximately 20,000,000 pounds to the swelling total of aluminum usage if acceptance of the small car meets expectations.

Just as the use of aluminum in the automotive field has constantly increased each year since the early 1950's, the future use of aluminum can only follow the spiral due to aluminum's inherent economic and practical advantages. Aluminum currently comprises, on an average, less than 2% by weight of the materials of construction needed for a current model car.

It has been estimated that by 1965 the annual rate of auto scrappage will have increased to 5.7 million units. Projecting historical relationships between new car output and scrappage, and allowing for other factors used in estimating automotive production, an annual rate of 8,000,000 new units by 1965 does not seem unlikely. With a predicted consumption rate of 169 pounds of aluminum per car, the use of aluminum in autos in 1965 would reach 680,000 tons. Even using an ultra-conservative figure of 6,800,000 cars and 80 pounds of aluminum per car, the total would reach 280,000 tons — an increase over the next five years of 100% over the 1959 model consumption of 140,000 tons. These figures include only the anticipated use of aluminum for new autos and do not consider the tonnage employed in replacement parts and non-factory supplied accessories, the usage for which is usually figured as 20% of the tonnage employed for original equipment.

Aluminum Bodies in 1903

Although aluminum's boom in the auto industry is hardly a decade old, its use dates back almost to the beginning of the motor car era. Aluminum sand castings were used in early models for crankcases, flywheel and rear-axle housings, transmission cases. In 1903 aluminum bodies were used for the Pierce-Arrow, Franklin, Peerless, and Jordan. Aluminum's light weight and machinability made its use practical at that time.

However, as mass production techniques developed, manufacturers turned to less expensive ferrous alloys and not until 1954, when pistons were converte 100% to aluminum, did aluminum allo regain widespread acceptance in th automotive field. Too, limited sourc of supply prevented expanded use aluminum as late as the end of Worl War II. With the entry of Kaiser an Reynolds into competition with Alc after the war (and more recently t entry of Olin Aluminum, Revere, Ha vey, and Anaconda as producers), au manufacturers now have varied and d pendable sources of aluminum capab of producing the tonnages needed f the millions of autos produced annual in the United States.

The development of new bright fi ished sheet and extrusion alloys, ne finishing techniques, new casting allo etc. furthered aluminum's inherent a vantages — such as light weight, cor sion resistance, excellent heat transf characteristics, and superior workabili When the weight and cost of toda car became serious problems to desi engineers, the early prejudices agai the light metal were dissolved and a minum was specified for such appli tions as pistons, exterior trim, transm sion housings and other castings, w resulting decreases in overall weight a cost. Not only were costs reduced d to aluminum's 3-to-1 weight advanta over copper, brass, or steel, but becau

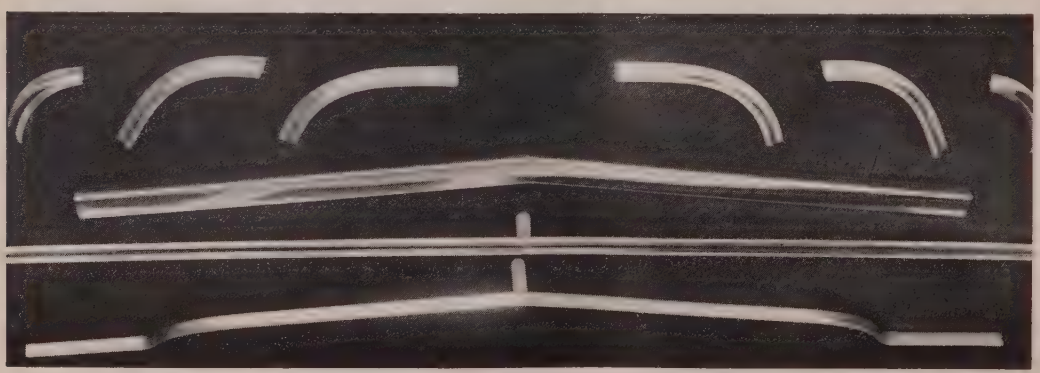

Figure 1. An ... ray of 1960 mod automotive pa... produced ... Brown-Lipe-Cha... Div'n, GMC, fr... 5457 alloy. N... variety of confi... rations produ... either by sta... ing or stret... forming as m... possible by alu... num's good fo... ing and finish... properties.

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Table I. Nominal Composition of Wrought Aluminum Sheet Alloys Used for Automotive Applications[1]

Alloy	Percentage Alloying Elements, Aluminum and Minor Impurities Balance					
	Cu	Si	Fe	Mn	Mg	Cr
1100	.15	.10	.60	.....	.....	.....
5052	.05	.10	.30	.....	2.50	.20
5357	.07	.08	.12	.30	1.00	.....
5457	.10	.06	.08	.25	1.00	.....
5557	.06	.06	.10	.15	.70	.....

(1) These values are typical, rather than guaranteed compositions.

of lower tooling, fabricating, assembly, and shipping costs for aluminum.

Almost all American cars have, at one time or another, sported aluminum grilles, mouldings, headlamp bezels, or other trim items fabricated from non-rusting sheet aluminum alloys protected by clear, hard, corrosion resistant anodic coatings. An average of over 10 pounds of sheet per car went into such products in the 1959 models. Figure 1 illustrates such parts for 1960 model cars. Castings are used for such varied applications as transmission housings, pistons, brake drums, fuel pumps, and automatic transmission components. Impact extrusions are used extensively in power steering and braking assemblies, while extrusions are used for grilles, mouldings, window frames, and other trim items.

Although the list of present applications of aluminum in the automotive field is impressive, the surface has hardly been scratched. Some of the more promising opportunities for aluminum are:

Bumpers. This is one of the applications closest to reality for the 1961 model cars. The bottleneck to date has been the lack of an available alloy having the combination of economy and required mechanical properties. Another prime requisite is excellent brightness after anodizing to the heavier film thickness required today for corrosion and scratch resistance. Although several non-heat treatable aluminum alloys are available with strengths equal to those of bumper steels, the alloying elements essential for the strength are detrimental to brightness in the anodized state.

A possible solution to this problem would be to clad a high strength, non-heat treatable alloy such as 5086 with a bright finish alloy such as 5457 or 5557. This may be impractical, however, due to cladding thickness limitations for clad sheet products and the possibility that the buffing required to smooth out wrinkles and distortions incurred during forming would penetrate the cladding alloy and result in two-tone.

An extruded bumper section requiring little forming may prove to be the most feasible approach, although a formed sheet product is still a possible answer. Actually, aluminum bumpers are not strangers to the automotive industry since for years trucks and busses have used aluminum bumpers with excellent results. Several European autos have also used aluminum bumpers.

The aluminum product that eventually qualifies for the passenger car bumper must meet requirements for dent resistance (resistance to flying rocks and low speed collisions), overall strength (jacking and towing), and should be capable of being formed using conventional tools and without inter-annealing or heat treating.

Safe For Bumpers

Aluminum's lower modulus of elasticity contributes to the safety characteristics required of bumpers since aluminum can absorb greater energy without deforming than can steel, and, therefore, also offers improved performance where pushing and/or towing are involved. In addition, aluminum's light weight can save approximately one-half the weight of a steel bumper and result in additional weight savings in the frame, bumper supports, etc. These weight savings can, in turn, result in decreased axle loading and surer, safer steering.

Wheel Covers. The possibility of the use of aluminum alloys for wheel covers parallels that for bumpers since similar alloys are required to provide the needed brightness, strength, and corrosion resistance for both applications. The use of a live steam and caustic solution in many automatic car washes presents a definite corrosion problem that is being overcome.

Radiators. The lack of an easily solderable aluminum alloy is a big deterrent to the use of aluminum in auto radiators. Pure zinc clad on aluminum has been evaluated by at least one major producer, but the cladding process is tricky and expensive. The economic advantages that have allowe aluminum to replace copper and coppe based alloys in many heat transfer pro esses also apply for this applicatio Aluminum's excellent heat transfe properties and resistance to corrosio are also favorable. A similarly promisi application is for air-conditioning co densers.

Wheels. Integrally fabricated whee and brake drums of aluminum are o tional equipment on the 1960 Ponti and are a distinct prospect for m models. This light, strong combinatio provides improved braking and less ti wear by quickly dissipating the he generated when stopping a two-ton aut Forged aluminum wheels have bee used for years in the trucking industr and cast aluminum brake drums we introduced in 1958 by Buick.

Body components. Lightweight al minum roof panels available in a varie of textures, finishes, and colors wou add distinctive styling touches and, the same time, lower the center gravity of the car. Also, integral hoo grille combinations should provide ec nomic and styling advantages.

Structural members. Light, stro framing members of aluminum allo would provide significant weight savin and result in lower operating costs.

Mufflers. Due to aluminum's natur resistance to corrosion by the nea 150 chemical products which have be detected in automobile exhaust, a lo cal use for aluminum is in exhau mufflers. Several auto manufacture initiated use of aluminized steel muffl in the 1960 models to employ the i proved corrosion resistance and res ance to oxidation of the steel at te peratures as high as 1800°F. Reyno Metals Co. has developed a cast alu num muffler that improves performa e by controlling condensation and di pating heat quickly and uniformly.

Motor blocks. Although the 19 Corvair engine block is aluminum, other American small cars and all the conventional 1960 autos have c iron blocks. [Two new compacts, Buick and Oldsmobile, are making th debut this model year. They will h e aluminum V-8 engine blocks. Ramb , too, will have an aluminum blo ; others are planned.] Once minor te nical problems are solved, the use f aluminum will extend to the big and eight-cylinder engines for Ameri 's front line cars. The use of alumin m for all engines, air or water cooled is imminent because:

a) Approximately eight aluminum engines can be cast from the s e weight of metal that yields only three cast iron engines.
b) The shipping cost for alumi m

(Continued on page 2)

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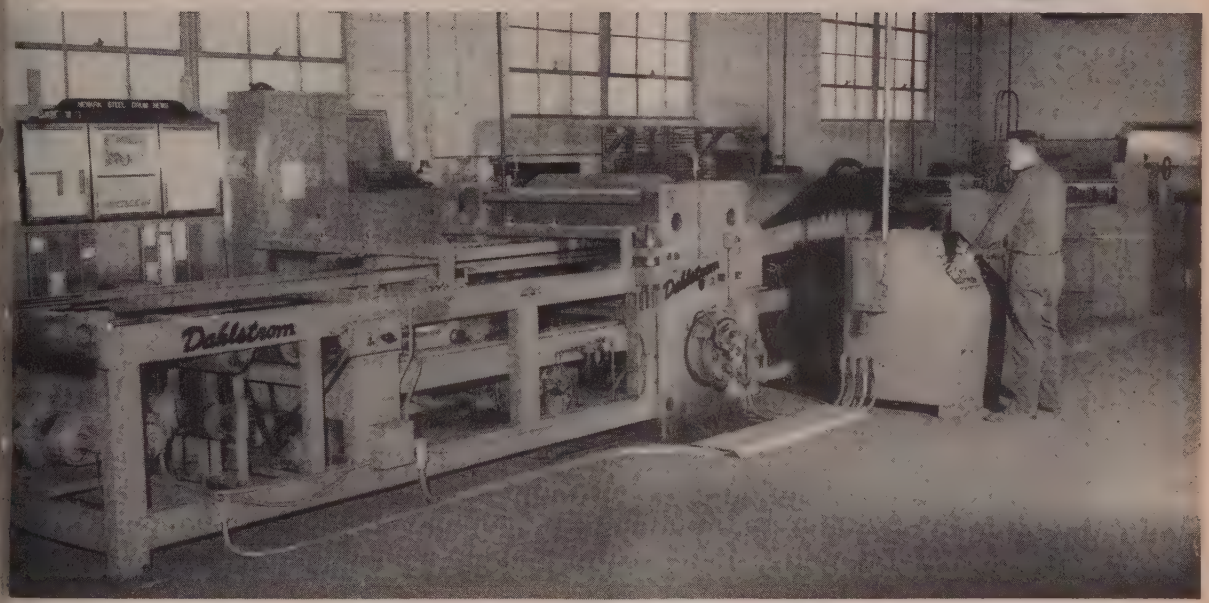

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Burger Boat Co., Inc. President, H. E. Burger says: "Surface preparation is 80 percent of the paint job. Alodine has been our surface preparation since 1955."

-building at Burger Boat Company's Manitowoc, Wis-nsin yards is the world's largest aluminum yacht, an 3-footer which will use 21 tons of aluminum in its con-ruction. Standard surface preparation for painting on is sea-going queen and *all* Burger aluminum craft—mchem Alodine conversion coating chemicals.

s the leading metal builder of custom and semi-custom leasure cruisers and yachts over 60 feet, Burger crafts-nen must produce the ultimate in boat construction and ppearance to meet rigid customer specs. Burger execu-ives are convinced that Alodine helps contribute to end roduct improvement in their boats, produces the base or a painted surface that will adhere and last. With the rice of paint failure on a single aluminum yacht running etween $6,000 and $7,000, to remove paint and start all over, Burger takes no chances with their high quality reputation.

Burger paint personnel find Alodine safe, easy to use and apply to large surface areas. The gold coating produced by Alodine permits visual inspection, makes it easy to spot "misses." Typifying this quality boat producer's viewpoint on pre-paint importance is the statement by Elias Gunnell, Vice President and Partner —"You can't permit paint loss to occur any more than you can permit a structural defect to show up in the boat."

Whether you're producing aluminum nails or yachts—or anything in between—you have a use for Alodine to make your product more durable, more attractive and more salable. Contact your local Amchem Representative, for details, his business is metal protection!

*Amchem's registered trademark for its conversion coating chemical for aluminum.

Amchem chemical cleaner is applied with long-handled, nylon brushes to the hull of the world's largest aluminum yacht.

Burger craftsman mixes Amchem Alodine solution preparatory to applying on hull of the big 83-footer.

Alodine is brushed on to surfaces of aluminum 83-footer which exceeded length of building, necessitated knocking out wall to accommodate prow.

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Write for Bulletin 1424C, gives detailed technical specifications on different Alodine chemicals available for pre-treating aluminum.

engine blocks is considerably less than for cast iron.

c) Machining, finishing, assembly, and tooling costs are usually less.

Although certain technical obstacles stand in aluminum's way for many new automotive uses, the big hurdle is economic. For example, to replace the presently used steel roof panels with aluminum, an approximate initial ratio of 6 or 7-to-1 for the cost of aluminum sheet per pound over that of steel must be contended with. Aluminum's 3-to-1 weight advantage, lower tooling, fabricating, assembly, and shipping costs help to narrow the gap; and as higher automotive volumes are experienced by the aluminum industry, the remaining economic disadvantage should be overcome as they have in the past.

Since misconceptions are inevitable regarding the use of aluminum in the automotive field, this article is intended to dispel some of the confusion and provide a realistic guide for the specification and use of all aluminum alloys suitable for such applications. Perhaps the references in the following pages and tables to alloy selection and application areas will be helpful to the automotive engineer.

Common Sheet Alloys

The more common sheet alloys are:

Alloy 5357. This is the alloy first used by the auto industry for bright anodized applications, although it was first developed to produce a pleasant frosty texture after caustic etching and anodizing. When automotive applications requiring buffing and/or chemical bright dipping prior to anodizing were introduced, designers were looking for an alloy with the brilliance of chrome plate after anodizing. Alloy 5357 was specified but did not fill the bill and only the super purity type alloys did meet the brightness requirements at that time.

Due to extremely high purity, these alloys were too expensive to warrant widespread use. As will be explained later, the purity of the alloy is of prime importance where the brightness of anodized surfaces is concerned.

Table I shows that 5357 is a relatively high purity alloy with magnesium, manganese and copper added to obtain desired strength, grain size control, and uniform etching characteristics, respectively. This alloy has mechanical properties slightly below those of 5050 alloy, and generally should be specified for those applications where a pleasing frosty texture is required, such as for certain interior trim items or grilles where specular brightness is not required.

Alloy 5457 was derived from experiments designed to improve the anodized brightness of 5357. Generally, this was accomplished by raising the base-metal purity and increasing the copper content. Using the proper casting, homogenizing, and rolling techniques, this alloy produces excellent brightness after anodizing. However, due to the increased purity, several undesirable features were inherited: generally larger grain size than for corresponding 5357 items, and a tendency to form Lueder lines when slightly deformed in the softer tempers.

The mechanical properties of 5457 are slightly higher than those of 5357 and approach those of 5050. This alloy and 5557 have supposedly similar bright finishing characteristics and should be specified for most applications requiring a bright anodized surface. This alloy also matches extrusion alloy 6463 after brightening and anodizing.

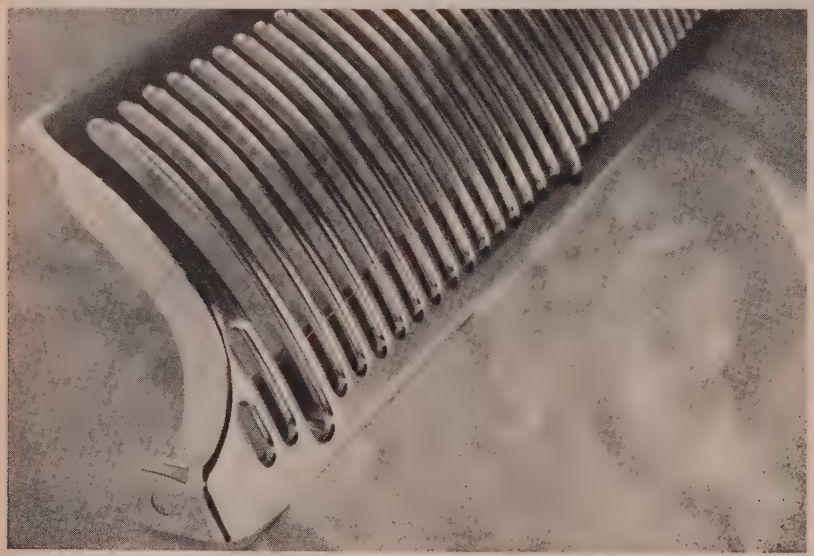
Alloy 5557 was designed to retain t excellent bright finishing characteristi of 5457 and minimize the Lueder lin problem. As can be seen in Table this was attempted by keeping the p ity level generally the same and red ing the manganese and magnesiu contents. Due to the decreased magn sium content, the mechanical properti of 5557 are somewhat below those either 5357 or 5457. Also, the decreas manganese results in somewhat coar grain size than for 5357. As previou stated this alloy and 5457 are availab for most bright finish applications a match extrusion alloy 6463, but 55 has found only a limited acceptance this field.

New Bright Finish Alloys. Since allo 5357, 5457, and 5557 have not been e tirely satisfactory in providing t brightness desired by the automoti people, considerable development wo has been conducted regarding slig alloy modifications to the 5457 a 5557 compositions. The two major proaches to the problem have been to entirely eliminate manganese ad tions and (b) to eliminate mangan additions but add another grain refi such as chromium that will not ha the same detrimental effect on finish brightness as does manganese. Wh full scale production trials have been made on these two modificatio there is reason to believe that an all along the lines of modification would be the most desirable and pro to be superior to 5457 in brightne

Other Alloys. Other applicatio which do not require visual exposu should be specified as to alloy deper ing upon the strength requirements. F example, a grille support that is to painted black could easily use 1100 all in an intermediate temper.

The selection of the proper temp for any particular job can be as imp tant as the alloy itself, since oran peel, brightness, scratch resistance, a ease of fabrication are all depende upon the temper selected. Fairly seve forming jobs such as the one sho in Figure 2 have been successful usi partial annealed tempers to replace or -H32 tempers. The results sh greater scratch and dent resistance, b ter brightness, less orange peel, clear blanked or perforated edges, and bet formability than for the softer temp in most cases.

Since many auto designers and en neers are still thinking in terms of hard, ½ hard, etc., the partial anneal tempers have not been accepted their true worth. Basically, this ste from the belief by many that 5357-H say, with an ultimate tensile streng of 22,000 psi would be more eas



■ ***Figure 2. This grille, used on the 1960 Corvair, is an example of the degree of forming possible with 5457-H25 sheet. Brown-Lipe-Chapin manufactured this piece.***

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formed than 5357-H25 with an ultimate tensile strength of 26,000 psi. Such is not the case; i.e., the degree of formability depends upon the spread between the ultimate tensile and yield strengths and upon the elongation, with all other factors equal. For similar gauge items, the spread between tensile and yield strengths for -H32 is usually less than the spread for -H25. The wider spread for -H25 is obtained by cold rolling to the equivalent of -H16 or greater and then exposing the metal to a low temperature thermal operation in the range of 400° - 500°F.

This recovery process has some effect upon the ultimate tensile strength but most significantly lowers the yield strength. It is only logical to assume that in order to form a part, the yield strength must be exceeded in order to permanently deform the work; yet the tensile strength must not be exceeded or the work will fracture. Therefore, since the yield strength of -H25 is hardly higher than that of -H32, and since -H25 generally has a wider spread between the ultimate tensile strength and the yield strength than does -H32, the -H25 can be just as easily formed as -H32 despite the significantly higher ultimate tensile strength of the former.

When specifying material requiring small radii bends such as those normally found in roll formed parts, the use of the minimum allowable bend radii data for various 5357, 5457, and 5557 tempers would be helpful. Generally, the minimum allowable bend radius not only increases as strength increases, but also as gauge increases in a temper.

The finish specification for aluminum sheet products depends upon several factors, which are listed in Table II along with the suggested finish for various finishing sequences. An example from Table II might be the specification of *mill finish* for an item that would be caustic etched, sanded, or wire brushed only prior to anodizing. On the other hand, for a part that is to be formed, buffed, bright dipped, and anodized, *mill finish* or *one side bright mill finish* might be specified; i.e., if the part is severely formed where distortion of the original surface is significant and considerable buffing is required, *mill finish* would suffice.

If the forming is only minor in nature, *one side bright mill finish* might be specified to minimize buffing. However, where a consistently high quality product is required, it is suggested that *mill finish* be specified and that adequate buffing be utilized prior to bright dipping and anodizing.

Toughness Vs. Brightness

It seems that the trend in the automotive parts finishing field is to employ less expensive bright dip solutions, less buffing, heavier anodic coatings, and to expect improved brightness. The heavier anodic film thicknesses, .0003-in. minimum in some instances, are specified to improve both corrosion resistance and scratch resistance. It is arguable whether added toughness at the expense of reduced brightness is justified. In general, the brightness of a bright finished and anodized item depends on the alloy purity and the anodic film thickness. The higher the alloy purity, the brigh the finish. Also, the thinner the ano film, the brighter the finish.

The purity of an alloy is significant that any constituents out of solid so tion that are insoluble in the anodizi electrolyte will generally wind up the anodic film or cause an unev juncture between the anodic film a the aluminum. The more constitue in the anodic film or the more unev the juncture between the metal and oxide film, the more the light is fused and prevented from directly turning to the eye. Therefore, m impurities in an alloy result in a dul anodic coating.

The film thickness is significant the same general respect; i.e., for heavier film thickness, the light has m chance to be diffused by the randon oriented constituents although the nu ber of insoluble constituents per u volume is the same as for thinner fil

The type of chemical bright dip a the practice used for most bright fin items bright dipped prior to anodizi also have significant effects upon finished brightness. Not only are imm sion time and bath temperature imp tant factors, there are such vital c siderations as transfer time (the ti lapse between the point when the wo leaves the bright dip tank and its en into the rinse tank) and the aluminu content of the bright dip solution. Sin transfer time should be kept to an ab lute minimum to obtain maximu brightness, automatic finishing syste used by many parts manufacturers a at a disadvantage: they're slow.

Only generalizations can be made garding the optimum conditions bright dipping since not only do con tions vary with different bright dip so tions and different alloys, they ev vary for material produced by differe suppliers due to metallurgical variatio

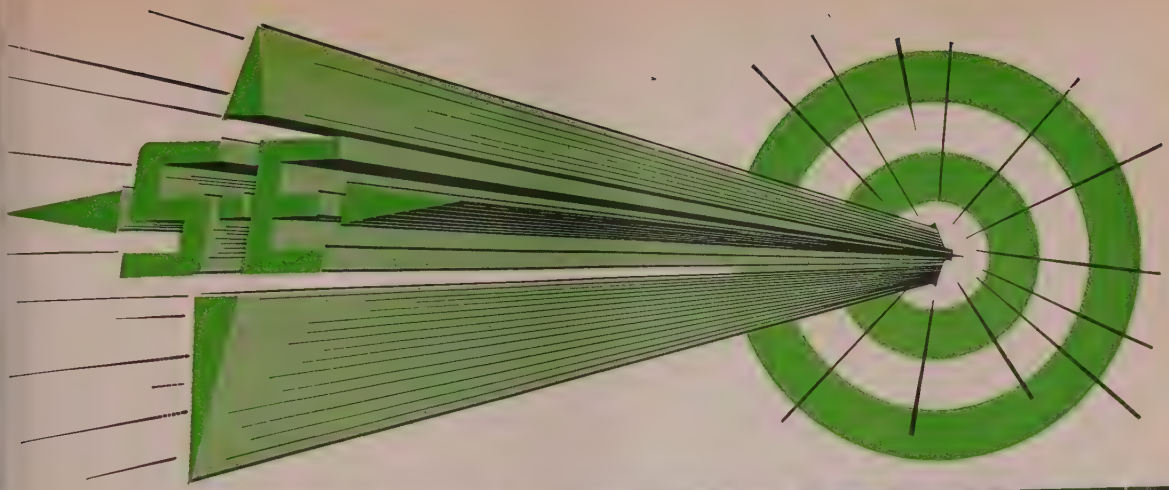
In the past, several organic coatin have been evaluated as possible repla ments for anodic coatings. Howev poor corrosion resistance, susceptibil to yellowing, crazing and other dra backs have discouraged their use. Sin anodizing actually dulls a bright fini by about 10 to 20%, depending on all and film thickness, development of organic coating immune to ultra-viol light and resistant to corrosion a crazing would completely change toda attitudes regarding bright finish par

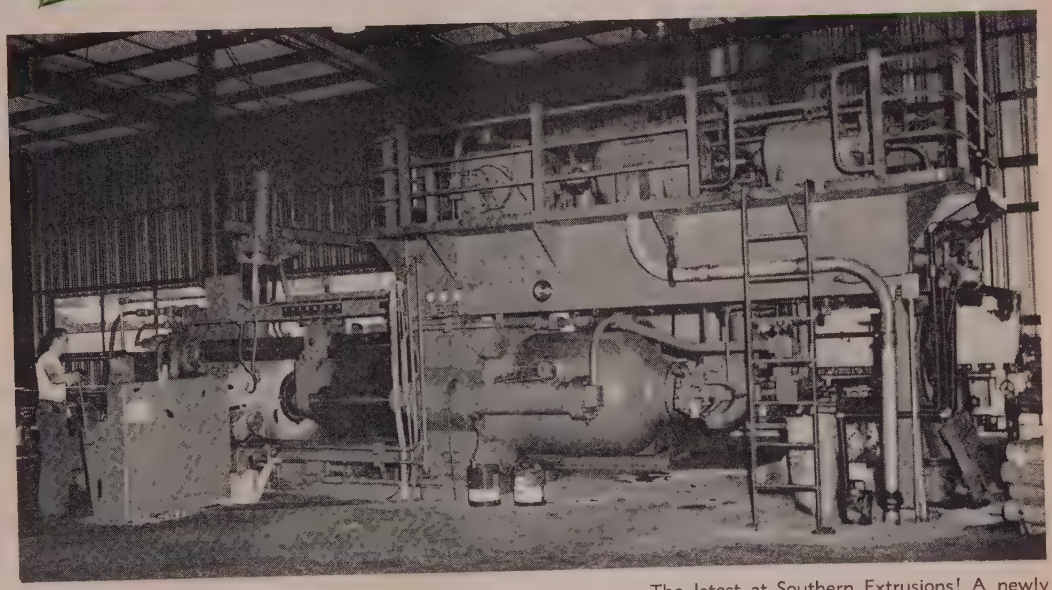
Despite the uncertainty which s rounds some important applications aluminum in autos, there can be lit doubt of the metal's continued grow in the industry. This increased promises greater all-around efficien without sacrificing size and comfort, a more pride of ownership for Americ future car buyers.

Table II. Suggested Finish Specifications for Sheet Aluminum Alloys Used for Automotive Applications

Finish Methods Employed

Slight Forming	Severe Forming	Heavy Buffing	Color Buffing	Caustic Etching	Wire Brushing	Sanding	Bright Dipping	Anodizing	Opaque Painting	Clear Organic Coating	Suggested Finish	
	X	X					X	X			Mill Finish	
	X	X					X			X	"	"
				X				X			"	"
					X			X			"	"
						X		X			"	"
				X						X	"	"
					X					X	"	"
						X				X	"	"
									X		"	"
X			X				X	X			One Side Bright Mill Finish	
X							X	X			"	"
X			X				X			X	"	"
X							X			X	"	"





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New Shear Line Cuts Sheet Fast, To Close Tolerances

USERS OF aluminum sheet for a variety of jobs have become increasingly tolerance conscious. Squareness, flatness and close length tolerances are particularly important where sheet must have a close fit.

This growing requirement among aluminum fabricators, particularly those handling sheet for mobile homes, boats, modular building panels and other large components has placed sheet rollers in an admirable position to improve their service to customers. It need hardly be pointed out that most of them are availing themselves of this opportunity.

A new shear line, installed at Quaker State Metals Co., Lancaser, Pa., enables the firm to meet its customers' tolerance requirements fully. Engineered and built by Dahlstrom Machine Works, Chicago, the new cut-to-length line produces accurately sized sheet in lengths up to 16 feet, and up to 48 inches wide in gauges ranging from .020 up to .125-inch. The installation replaces a line designed by Quaker State engineers.

The new cut-to-length line will handle coils up to 6000 pounds, having coil I.D. range of 16 to 20 inches. The aluminum can have a maximum yield strength of 40,000 psi.

Desirable Features

Features of the coil reel, or unwinder, include an expandable mandrel powered by a rotary air cylinder and equipped with a 1 hp reversible motorized threading set-up and clutch.

Tension is exerted to prevent the coil from over-running and to aid in tracking the material through the line. This tension is introduced by use of an adjustable air brake with which the reel is equipped. All welded construction and a Timken roller bearing-mounted mandrel are other features of the reel design.

The Dahlstrom Model 48.125AL-10 roll straightening unit is all-welded construction and can produce flatness in coil in thickness from .016-inch through .125-inch aluminum. This unit has a pair of 6-inch diameter feed-in rolls, nine 4-inch diameter straightening rolls, and one 4-inch diameter idler roll for fine adjustment.

Top and bottom feed-in rolls are rubber covered, and the top roll is raised, lowered and loaded by an air cylinder. All feed-in and straightening rolls are power-driven and mounted on anti-friction bearings.

The straightener is driven by a 30 hp variable speed brake motor having a speed range of 30 to 180 fpm. The drive is equipped with an air clutch, visual speed indicator, and motorized remote control within the speed range. The straightening rolls and idler roll have visual gauge adjusting indicators.

The hump table is the next feature of the Dahlstrom shear line. This unit is designed to take up the slack formed by the continuous feed of aluminum from the straightener and the momentary halt in passage of the metal while it is being sheared. Designed like a drawbridge, this adjustable unit has all-welded tubular construction and is equipped with a dual screw jack and crank mechanism so that the hump can be adjusted to suit line speed and thickness of the metal. The rollers on this table are neoprene coated to prevent scratching of the aluminum, minimize noise and assist in hump dissipation.

Details of Shear

The high speed power squaring shear that follows in the line is under-driven, has a 300 rpm, ball-bearing flywheel and has an air brake and air clutch equipped with necessary filter-oiler-pressure regulator. A 15 hp motor provides the power. This shear is equipped with a stripper and a hold-down in the form of a complete bar which is die rubber covered. The bed is covered with non-scratching material to protect the metal.

Another feature of this component of the Dahlstrom shear line are rubber covered, air motor driven rolls which gives fast hump dissipation and assists the operator in advancing the tail end of the coil through the shear after it leaves the confines of the roll straightener.

Installed in conjunction with t squaring shear is an electric count which can be pre-set for the number cut sheets required for a particular der. Upon reaching this quantity t entire line will shut down.

Accurate measurement of pieces to cut is a key requirement in a shear li Quaker State uses Dahlstrom's Positi Stop Measuring System, coupled wi a belt type conveyor take-off. In t unit belt roller shafts are mounted anti-friction bearings and have indivi ual belt tightening capability. Power by a 3 hp variable speed motor (wi motorized remote control and visu speed indicator), speed is 50 to 250 fp

For Precise Measuring . . .

The positive stop measuring head h motorized traverse with direct leng reading on mechanical counter in hu dredths of an inch. A hand-wheel p mits refined adjustment.

Dahlstrom offers an alternate to t Positive Stop Measuring System in t form of a patented Electronic Surfa Measuring system. This device inclu push-button, instantaneous leng changeover — even while the line running.

"It is possible with this setup to lengths from 1 inch minimum to an finite 'theoretical' maximum," a Da strom sales executive said.

However, the Positive Stop Measuri System gives Quaker State Metals cl length tolerances repetitively, an imp tant requirement for any quantity bu of cut sheets. Inasmuch as the r terial is bought by the pound, c sistently close tolerance means minim

■ *New shear line at Quaker State Metals Co. In foreground, right, is stacking conveying unit. Operator is adjusting back-up leveler. Behind him are measuring shear, hump table, straightener, unwinder.*

cost. Also, if it were not for the tolerance feature of the Quaker cut-to-length line, the customer ıt frequently have to go to a second ring operation before he could use heet, a cost factor he wants to avoid. ı important design feature of this suring device is the integral con- tion of the framework of the con- r with the shear. Result is that ation at the cutting point is all but existant, which helps maintain close rance shearing.

ength changeover for the Positive Measuring System is fast and effi- t, according to Quaker State. The required for a length change de- ds mostly on the difference in the gths being run; thus, a change from ot lengths to 10-foot lengths would longer to make than one from ot to 4-foot lengths.

he measuring head is provided with ush-button motorized traverse with ct reading of length on a mechanical nter in hundredths of an inch.

he range of lengths available with positive stop measuring system ıld be from about 12 inches to a ximum of 40 feet. Actually, this max- ım length could be extended, de- ıding on the gauge range used.

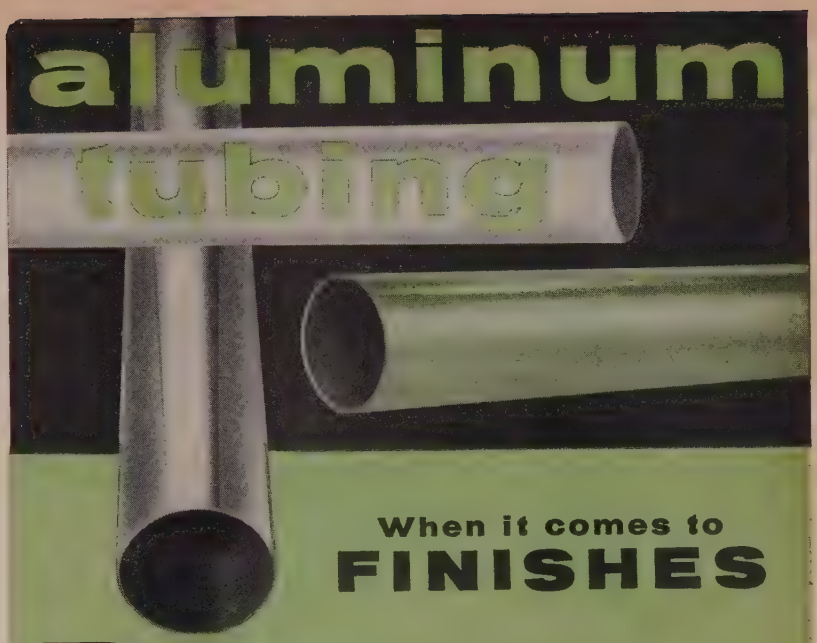
ghly Efficient for . . .

The Positive Stop Measuring System particularly efficient when running heavier gauge range (from 10 ough 26 gauge). These thicknesses ve an inherent stiffness that lends it- f to holding good tolerances while ng the positive stop. On thinner uges (27 through 29 gauge), special hlstrom designed roller hold-downs part the necessary stiffness to prevent mpression between shear blade and p, thus giving close tolerances.

Quaker State Metals Co. purchased a tton-Maust multi-backed up roller veler for use in attaining stretcher- veled quality flatness. This degree of tness is desirable by some of Quaker ate's customers, depending upon end e of the sheet. The firm also has an dependently installed Bliss stretcher- veler.

Final element of the Quaker State t-to-length line is a Dahlstrom auto- atic stacking unit. This unit is com- sed of motorized adjustable flippers d side plates, and motorized end stop. he end stop is air cylinder retracted for d discharge of loaded pallets. The t lengths will be conveyed onto the ppers and upon making contact with target will be dropped on air into the nfines of the bell mouth stack con- ining walls. The base of this unit is powered roll conveyor to assist in un- ading the stacker.

The complete line is floor mounted.



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Heat Treating Aluminum In Steam Atmosphere Cuts Finishing Costs

by F. L. Spangler and M. E. Lackey
Leeds & Northrup Co., Philadelphia, Pa.

■ *Steam heat treating these clutch arms cut buffing co*

ONE of the major considerations in fabricating nonferrous metals such as brass, bronze, aluminum, beryllium copper, etc., is the extensive and costly chemical and mechanical cleaning operations often needed to remove surface oxidation formed during annealing, stress-relieving, or other heat treatments.

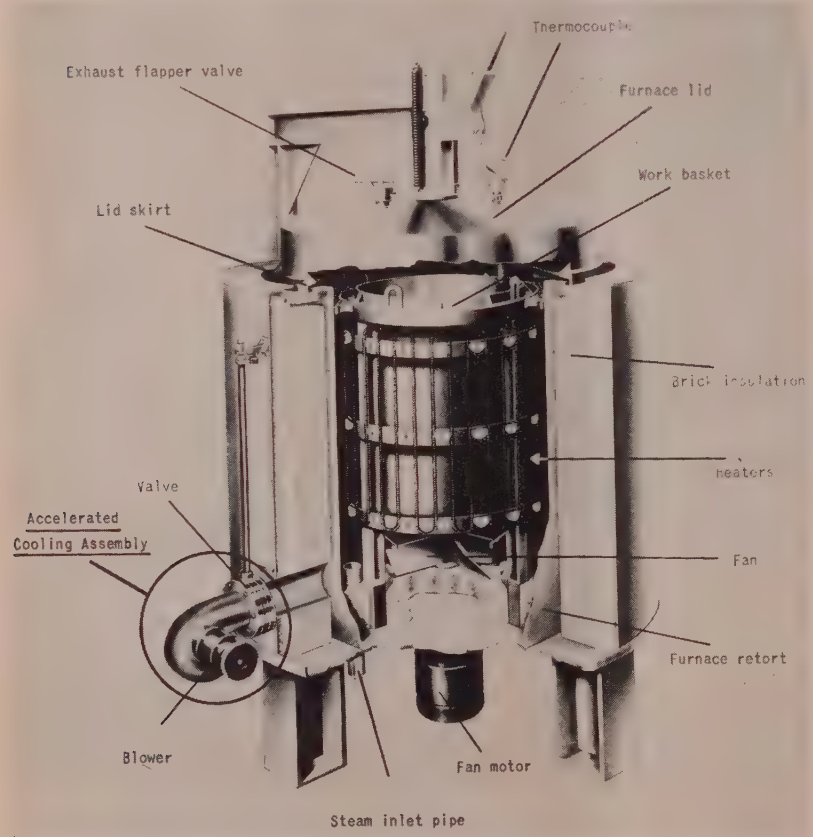
Within the past few years, however, many manufacturers have substantially reduced, and in some cases eliminated, such cleaning operations by heat treating in a steam atmosphere rather than in air. Steam atmosphere inhibits oxidation on many nonferrous metals in the temperature ranges required for their normal heat treating operations.

Many aluminum parts such as electrical and machinery components fabricated from heat treatable alloys require a final chemical or mechanical cleaning. On such parts solution treating in a steam atmosphere results in a more uniform, more metallic, and more reflective surface finish, compared to the duller matte finish obtained with air. Typical examples are the aluminum alloy clutch arms shown above. Solution treating them in steam atmosphere reduced the cost of subsequent buffing operations by 40%.

Steam atmosphere heat treating of nonferrous metals is safe, clean and the equipment is easy to operate. Equipment required includes a sealed, forced convection type Homo furnace (ill strated), a panel-mounted, automa temperature controller, and a relia source of steam from a small genera or regular plant steam lines.

If parts have a light cross sect and the load is small or light in weig best results are obtained by load and purging the furnace with ste at about 400°F before heating to processing temperature. When pa have a reasonably heavy cross-sect and the load is fairly heavy, the pu can be eliminated. In such cases, pa are loaded at operating temperat and steam is turned on immediately

Brass and bronze parts such as va fittings, fasteners, cosmetic contain and cartridge cases, may be annea and stress relieved clean in a steam mosphere. Where successive drawing forming is required the steam annea parts are free of the heavy scale t is so damaging to tools and dies. P ling between successive forming op tions, formerly necessary to rem scale, is often eliminated or at l substantially reduced.



■ *Sealed, forced convection type Leeds & Northrup Homo furnace is easy to operate. Also needed: Automatic temperature controller; reliable source of steam.*

Minor Finishing Needed

Many parts come from final la treating acceptable for use "as Others, which need plating, require a quick bright dip or light buff to re move the slight oxidation formed dur ing steam treating.

Optimum surface conditions on p ts fabricated from copper, brass, bro ze and other high copper content al ys are obtained by furnace cooling t a lower temperature before transfer to exposure to air. Furnace cooling is m le practical by the accelerated cooling as sembly.

At the end of the soak at temperat e, the valve on the cooling vent is ope ed and a motor-driven blower is start d. Cool ambient air is pulled in and ir culated up through the annular spa e between the brickwork and the ou retort, thus cooling the work load wh le it is still under the protective ste m atmosphere. A typical cooling cyc l from 1000° to 300°F — on a heavy-l ct load takes approximately two hou

EVEN DOUBLE THE THICKNESS:

Fairmont Stainless Clad Aluminum sheet gives you FASTEST, MOST UNIFORM HEAT TRANSFER

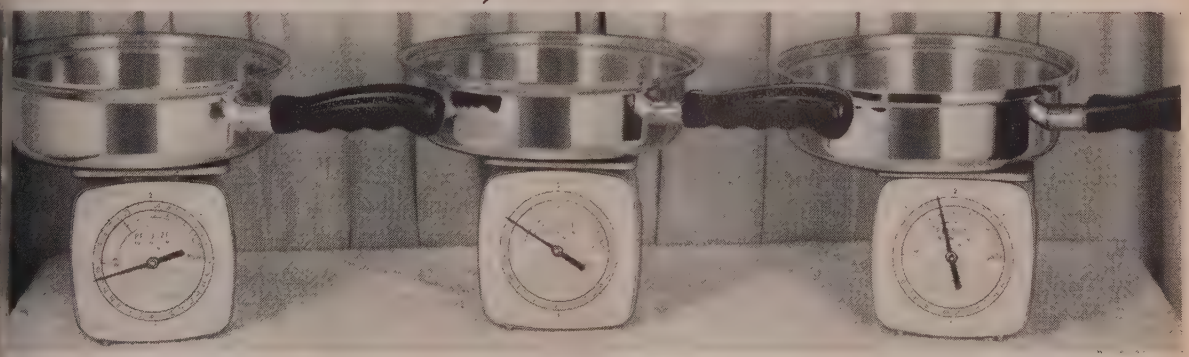
Fairmont Stainless Clad Aluminum **.100 THICK**

Copper Core Stainless **.050 THICK**

Carbon Core Stainless **.050 THICK**

After five minutes at maximum distance from controlled heat source, pan made of Fairmont Stainless Clad Aluminum, even though double thick, shows 290° F at side wall—in comparison with 230° F for copper core pan and 120° F for carbon core pan. Utensils furnished by courtesy of Vita Craft Manufacturing Company. The testing devices courtesy, Leeds & Northrup.

LIGHTEST WEIGHT, WITH STRENGTH



Fairmont Stainless Clad Aluminum **.100 THICK**

Copper Core Stainless **.050 THICK**

Carbon Core Stainless **.050 THICK**

Although twice as thick and correspondingly strong, the Stainless Clad Aluminum pan weighs up to ⅓ less than the copper core or carbon core pans. This means lower shipping costs. Also, increased sales appeal to Mrs. Homemaker, who will simply love a sturdy pan that's nevertheless easy to lift.

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CURRENT COATED COIL BOOM CALLS FOR WIDE PAINT LINES

The ever-lengthening list of end produc of painted aluminum, coupled with th growing popularity of painted buildin panels and siding, indicates a rosy futu for strip coaters. That's why Pre Finis Metals Inc. installed a 48-inch wide lin

THE MARKET for painted coil is booming as it has never boomed before. Strip coaters in the Chicago area have been enjoying a surge of business that was hardly affected by the recent business dip. Now, with the general economy on the up-trend, the short range period ahead looks especially good, with the list of end products capable of using painted aluminum and steel coil growing longer, more diverse.

This is the case at Pre Finish Metals, Inc., Elk Grove, Ill., a firm that recently completed an ambitious expansion program. Large display boards set up in the company's executive offices demonstrate the use of precoated aluminum in products such as acoustical ceiling tile made by Johns Manville (.007-inch thick aluminum is used), and other items such as roll-up awning slats and aluminum shingles.

But the company's clientele is not confined to the building products field. Serum bottle caps produced by another customer are a strip-off design and are made of .006-inch precoated aluminum coil supplied by the Elk Grove firm. A manufacturer of safety goggles uses pre-painted aluminum for side shields, first perforating the metal, then stamping out the shield forms.

Automotive to Appliances

An automotive company buys .025 inch thick coated coil, cuts blanks about 17 inches long and 12 inches wide, then stamps out dash bezels for its compact car as well as one of its trucks. A water heater manufacturer uses pre-painted aluminum for the doors. Another company uses .050-inch precoated aluminum for shelf support channels. In anoth instance, two-tone fishing tacl trays are made by shallow drawi prepainted aluminum coil that h a different color on each side.

Pre Finish Metals is now oper ing its new wide coil coating li at near capacity, according to R N. Crabtree, general manager. Te 450-foot line is housed in a n wing of a building that was co pleted in 1960. The line can doub coat coil stock up to 48 inches w in gauges from .010 to .062-in Maximum capacity of the line h not been achieved, but Crabt estimated that the initial daily o put is well over 350 tons.

Pre Finish, in deciding on a fi to supply the metal handling equ ment for the new line, picked Th Yoder Co., Cleveland, Ohio, ma facturer of roll forming equipme

■ *From water heater doors (upper right) to the smallest tear-off serum bottle cap (not shown). That's the story of the growing diversity of application of painted aluminum sheet and zooming demand for the material. Other items shown are a patented shingle (top left), table legs, compact dash bezel (below, left), light pickup truck (1961) dash bezel, a shelf support, safety goggle side shields, film reel can, and fishing tackle ay. Independent coil coaters are operating at near or full capacity, with steel threatening to overtake and pass aluminum. Re on: steel industry is willing to leave this business to others.*

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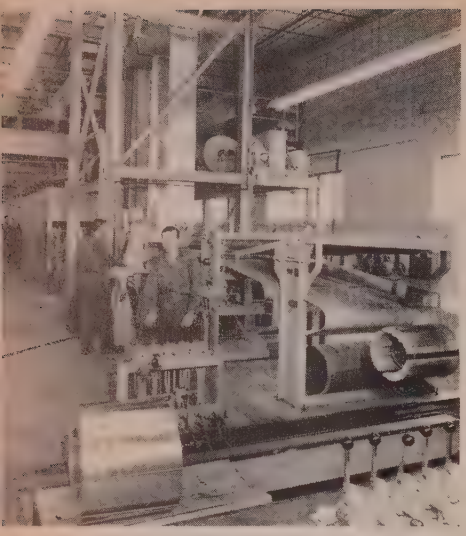


■ *Entry end of Pre Finish Metals' new wide coating line shows coil car, arbor loading controls. Sheet accumulator is in the background. Pre Finish did the complete engineering job for this high-speed, versatile coating line. Booming demand for coated coil makes wide coating lines very desirable. Slitting lines then come into play.*

tube drawing machines, and terminal and tensioning apparatus for coil handling lines.

Yoder supplied all terminal equipment; that is, uncoiling and recoiling equipment, entry and exit accumulators and other tracking devices, coil cars, etc. This is a comparatively new activity for the Cleveland company. Pre Finish Metals is reportedly their third customer.

Highly Automated

At the beginning of the line, two entry coil cars and two uncoilers ease the task of keeping the high speed operation moving. Coil cars move coils of metal along tracks to the arbor of each uncoiler, then raise the coil to the level of the arbor for easy loading. A new coil is always ready for splicing to the preceding one.

Wide coil calls for unusual splicing equipment. At Pre Finish a composite assembly was designed and built by The Yoder Co., using two Model S25C Bostitch stitching heads with 25-inch throats. The heads are mounted on tracks so that they can move over the splicing surface. A foot-operated solenoid control actuates the stitchers, permitting the operator to staple at will rather than produce a continuous seam. Twenty to 24 staples are sufficient to join the two ends.

When the new coil has been spliced it is tracked through an accumulator tower, designed solely to facilitate coil splicing without changing the speed of the coating and baking operation—and then heads into a pre-treatment system that applies Bonderite conversion coating by Parker Rust Proof Co., Detroit.

Pre Finish Metals' conversion coating line is designed to handle three different coiled metal products—aluminum, cold rolled steel and hot dip galvanized steel. Inasmuch as each metal requires a different treatment, the line has seven stages.

In the case of the cold rolled steel the process begins with a cleaner, followed by a warm water rinse, after which Bonderite 901 (iron phosphate treatment) is applied. Finally, there are two rinses.

When Aluminum's Scheduled . . .

When Pre Finish changes to an aluminum run, they by-pass the Bonderite 901 and simply turn on the pump for the Bonderite 721, which is right in the line, and utilize all other stages.

There is no separate tank for galvanized stock. Instead, Pre Finish stores the 901 treatment and replaces it in the tank with Bonderite 37 (zinc phosphate pretreatment for hot dip galvanized). All other stages stay on when this treatment is used.

The seven stages of the Bonderite line at Pre Finish Metals are in this sequence:

1. Cleaner (Parco 344)
2. Warm water rinse
3. Bonderite 901 for cold rolled steel, or Bonderite 37 for hot dip galvanized
4. Cold water rinse
5. Bonderite 721 for aluminum
6. Cold water rinse
7. Chromic acid rinse.

Production of consistently uniform finish coatings depends on several factors, not the least of which is creation of a uniform pre-paint treatment. The chromate conversion coating used for aluminum at Pre Finish provides tooth for the paint to adhere to, while imparting own layer of corrosion protecti for the aluminum.

Continued use of the pretreatm bath causes a build-up of alumin and chromium salts. These conta nants would impair uniformity the conversion coating were they neutralized. The Parker system complishes this with a cation change unit through which a porti of the bath is circulated. When ion exchange resin in the reacti column is saturated with impurit the unit is taken out of service a is regenerated.

This Parker reactifier unit sembles a water softener somewh and is connected to the pretreatm line. A simple titration test tells operator when the resin tower ne regeneration. However, in the c of Pre Finish Metals — or other w coating lines operating in two three shifts and at speeds of feet a minute or higher—one rea fier is not sufficient; two units installed, one as a stand-by, for while the other is being regenerat

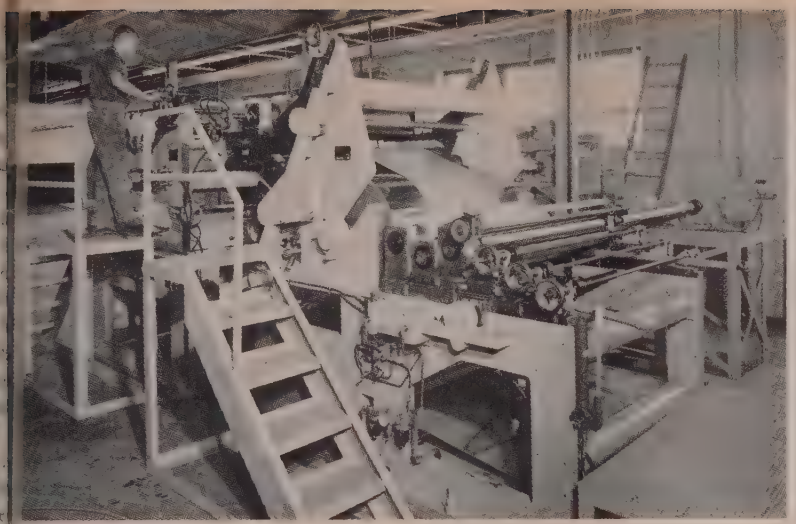
Coating and baking are the n stages. The first roll coater is a t roll unit used for prime coating, signed and built by Faustel, I Butler, Wis. This unit is capable both direct or reverse coating either side of the coil.

The manufacturer reported th instead of using dovetail ways on slides, they have included spe roller bearing gibs with adjusta wear take-ups which are said maintain roll accuracy for ma years. Each of the seven rollers its own individual variable sp synchronous motor drive with own frequency regulator.

Fast Coating, Because . . .

In the usual coating line, finish with plastisol or organosol pa would require two passes, the for prime coating and baking, lowed by a pass for finish coa and baking.

Pre Finish Metals achieves pr painting and finishing in one because an oven, designed espe ly for baking prime coats, is stalled after the prime roll co Built by The Lanly Co., Clevel this single oven has a high tem ature capability. Next in line is Faustel finish coater, a three unit having all the features of



new family of roll coaters makes its debut in the new Pre Finish line. Shown here is tel, Inc. prime coater. Finish coater is installed after a Lanly prime coat bake oven.

-roll prime coater.

A Faustel offset rotogravure ma- ne is next in line. In this process, nt is doctored off an etched steel ogravure cylinder with a doctor de, then transferred to a rubber et roll before coming into con- with the metal strip. The same tures are built into this machine are used on the coaters to provide ooth and accurate adjustments. side register control is accom- shed by shifting the entire printer four-inch ball type slide bushings response to an electric pick-up. is is easier than adjusting the ck of the coil, Faustel said.

Printed coil then runs through an- her Lanly oven, this unit a three- ne design. Both ovens, incidental- are gas fired and have about e same temperature range.

An embossing unit is next on the e Finish 48-inch coating line. ed mainly for embossing plastisol ishes, the unit can be converted ickly to laminate all types of pre- inted films, including DuPont's edlar, and Goodyear's Videne.

Wide coating lines are of growing portance to contract strip coaters cause they boost production to eet the steadily increasing demand r painted coil stock. Some 62,500 ns of painted aluminum coil will ve been shipped by year's end, counting for about 10% of the dustry's total sheet business, ac- rding to an estimate by Reynolds etals' market research people. By 965, consumption will swell to 0,000 tons annually, they say, and this will represent 15% of total sheet business that year.

An installation consisting of a wide coating line and a slitter enables a strip coater to multiply his output, whether it be for his own products or for contract work.

Markets for precoated metal are being pursued by nearly all firms equipped to handle this work, including several primary aluminum producers. The fact that the steel companies have neglected the business is a boon to outfits like Pre Finish. The independent strip coaters do a tremendous volume in steel each year, and it continues to rise.

More and More Tolling

On the other hand, the growing volume of painted coil produced by Alcoa, Reynolds and Kaiser is reflected in noticeably reduced aluminum volume handled by the independents. Currently, Pre Finish is coating aluminum for Reynolds, so great is that primary producer's need for coating capacity. Doubtless other independents are serving the primary producers this way.

However, it shouldn't be assumed that Pre Finish Metals is settling down to a situation where its aluminum work is exclusively for the primary producers and some of the independent sheet rollers. They aren't losing track of painted aluminum's future in many product manufacturing fields. As far as Roy Crabtree is concerned, that small order is still mighty desirable business, particularly if the end product has a future.

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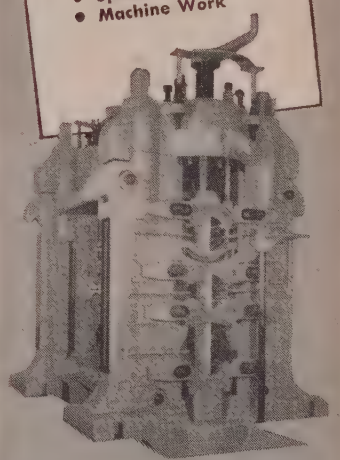

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GRAY IRON CASTINGS

Brazing replaces machining . . .

. . . in a new production process under d
velopment at United Shoe Machinery Cor
Appreciable savings can result from replacir
machined steel parts with assemblies mad
up of aluminum stampings that are stacke
then dip brazed to form solid component
New method seen as promising approach
making complicated, odd-shaped part

SIZABLE savings in production costs may be realized by replacing expensive machined steel components with parts made of brazed "stacks" of aluminum stampings. Development of the unusual process is underway at the Beverly, Mass. plant of United Shoe Machinery Corp. A number of interesting applications are under investigation.

In process of development, for example, is a cement applicator with internal cavity for cement flow. Making it of brazed aluminum stampings may well spell an appreciable cost saving over the present machined stainless steel unit.

Similarly, a feed rail for a processing machine is presently made of two steel rails and a machined block. Using dip brazing, a sample stacked aluminum stamping part was produced for evaluation, and it promises to reduce costs substantially. It is composed of a rectangular 6061 aluminum bar stock cut to length, straddle milled and brazed together, utilizing a spacing fixture between rails.

Machining operations and drill jigs presently required for assembling the steel unit would be eliminated, along with 8 drilled holes, 4 tapped holes, and 4 reamed holes, plus purchase and assembly of 4 screws and 4 pins.

The method of forming stacked aluminum stampings as used in the cement applicator holds interesting possibilities along other lines now being investigated.

Nineteen stampings from Alcoa aluminum brazing sheet are arranged in alternate thicknesses of 0.075-inch and 0.012-inch to form the applicator. Placement of brazing filler alloy is eliminated by the use of clad sheets, which have the additional advantage of uniform filling in minimum time. An internal channel for cement flow through the piece is simply stamped into the required number of center pieces (see sketch). These are then positioned properly in the stack for brazing.

Nested parts are fixtured by clamping them with a spring. After brazing, the only finishing required is a light grinding of the edges, drilling of one hole, and drilling and tapping of another. Thus, besides substituting a relatively inexpensive material for the part, dip brazing has substantially decreased machining operations.

In making a prototype of the n
cement applicator, both investment c
ings and the brass brazing of stack
steel stampings were also considered b
discarded in favor of the brazed alu
num stacks.

Originally, United Shoe Machinery
stalled salt bath equipment of Ajax El
tric Co. (Philadelphia 23) for dip braz
a wide variety of aluminum mic
wave components and sub-assemblies
military and commercial applicatio
They are still used regularly for th

Thus, with suitable equipment read
available for experimentation, tech
cians began evaluating possible use
the brazing installation for cost red
tion in replacing machined, forged a
cast parts used in their regular prod
tion lines. The production of com
cated and odd shaped parts from stack
aluminum stampings was an outgro
of this effort, in line with USMC's c
tinuing investigation of new product
techniques, methods and materials.

Donald F. Herdeg, United pro
engineer, emphasizes the importance
proper design for aluminum parts to
dip brazed. Avoidance of areas wh

Four types of aluminum stampings used to form dip brazed prototype cement reservoir part shown at left in photo at top of page. In stacking, .075-inch and .012-inch stampings are alternated to provide .075-inch slots in which are cemented stainless steel tubes. System eliminates ma chining operations, 8 drilled holes, 4 tapped holes, 4 reame holes, purchase and assembly of 4 screws and 4 pins i part shown at right above.

SALES LEAD BULLETIN

DEFENSE MARKETING SERVICE * KAISER ALUMINUM

April 21, 1961

The following government agencies have issued i

ADVANCE N

1. APPROXIMATELY 20 PERSHING TRANSPORTER ERE(MISSILE AGENCY, Redstone Aresnal, Alabama specifications on this requirement for la weight structure design for the pershing Cleveland. Design is to aircraft standa Interested bidders should contact their Only thirty days will be allowed for pre tion is issued, so a preview of the pri

2. 1171 ALUMINUM FLOODLIGHTS --- Issued by Chicago Corps of Engineers, 226 W. Jacl 61-AF-448-JDB opening May 2, 1961 ---

3. 1500 PAIRS ALUMINUM CRUTCHES --- Issue Illinois --- Bid No. M-3-39 opening M wooden arm and hand pieces, adjust.

4. 570 MOUNTING PLATES FOR SAFETY AND AI (T45E1) WARHEADS --- Issued by ORDNA IFB-ORD-11-173-61-18B -- opening May processing, drilling and wiring. De Iowa --- Requests for invitations f 1961. Bids will not be mailed to f Small Business Only.

5. 490 RING AND SHELL ASSEMBLIES --- DEPOT, Crane, Indiana --- IFT 164- tooling available.

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Hollis G. McLaughlin

H. G. McLAUGHLIN
Manager of Sales—Defense Market
Kaiser Aluminum & Chemical Sales, Inc.
Kaiser Center, Oakland 12, Calif.

KAISER ALUMINUM

salt can be trapped, placement of drainage holes, optimum joint clearance, and length of joints are important considerations, he explained.

The designing of parts to be self-mating or self-locking is ideal wherever this is feasible, according to Herdeg. In any event, there should be early determination of how parts can best be fixtured for holding them firmly and accurately in place for the brazing process.

United employs various fixturing methods including clamps, constant-force coiled bands, and wire springs of stainless steel used singly or in combination, depending on the part involved. Also, Herdeg emphasizes the importance of having working surfaces of the aluminum in proper condition for dip brazing.

A typical dip brazing cycle at United proceeds as follows: Degreasing of any soiled parts; a cold water rinse; cleaning in a 180°F non-etching caustic bath to remove oxides and dirt; a flowing cold water rinse; desmutting with cold 40% nitric acid; another flowing cold water rinse; and drying with forced hot air.

The assembly is then fixtured; preheated for 3 to 6 minutes at 1100°F in an electrically heated air furnace; and dip brazed in United's Ajax electric salt bath furnace at approximately 1100°F for 1 to 2 minutes (exact timing and temperature depending on mass of the part and length of joints).

Compact Brazing Setup

Then salt is drained and assembly is air cooled for 15 to 30 seconds; water soaked at 200°F; dipped in a cold 40% nitric acid or cold nitric-hydrochloric acid bath to remove all salt: cold water rinsed; hot water rinsed; and finally dried in hot air.

The heart of the installation is an Ajax Type HCRE electric salt bath furnace having bath working dimensions

■ ***Preheated parts are dip brazed in Ajax Electric salt bath furnace. Six or more joints per part are often brazed simultaneously; assemblies are usually ganged for maximum economy. Brazing takes 1 to 2 minutes at approximately 1100°F, depending on mass of parts, length of joints and alloy used. Most parts are hung from wires or placed in wire racks for dipping.***

of 18 x 15 x 22 inches deep. Because of the speed with which brazing is accomplished — 1 to 2 minutes per load — all of United's brazing can be done in this one furnace.

The entire aluminum dip brazing installation occupies about 500 square feet of space. With preheat and salt bath furnace adjoining, dip tanks for wash, rinse and cleaning operations, and assembly benches are compactly arranged. Operators pick up fixtured loads with steel tongs from which assemblies are extended for immersion into the salt bath and flux removal tanks.

Time for handling a complete cycle runs in the neighborhood of 22 minutes.

Most aluminum assemblies are hu from wires for dipping. Normally, jo are ganged up and a number of asse blies are dip brazed simultaneously f maximum economy. There are prac cally no rejects. Should a fixturing err occur, as occasionally happens in fi samples of some of the more comp cated assemblies, this can often be r worked.

One typical microwave product — harmonic generator and balanced mix assembly — consists of three cryst mounts, a magic tee, and wave guid extension components which are braz individually. The completed unit i cludes a total of 30 brazed aluminu parts involving many different shap and thicknesses.

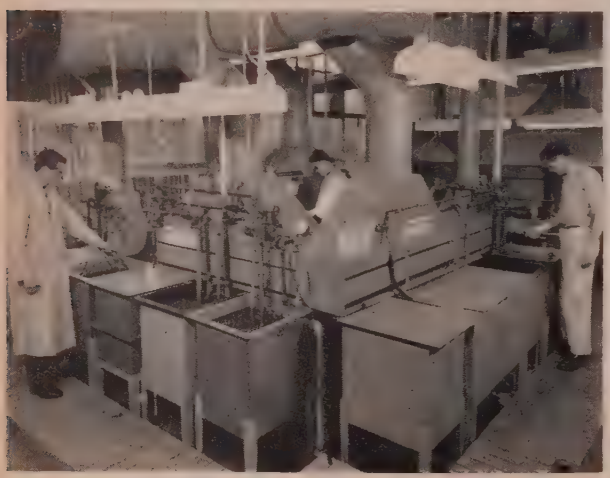
United is sufficiently impressed wi the possibilities of redesigning oth standard parts of its commercial line f dip brazing that production designe are now reviewing new and older asse blies and making trial parts.

"When aluminum and other lig weight metals came into widespread u in military equipment a method sticking them firmly together had to found," explained J. E. Martin, manag of United Shoe Machinery's Electroni Division. "Salt baths did the job a mirably, but why stop there?

'Remarkable Advantages'

"Already we have gone far enou to prove that dip brazing techniqu have rather remarkable advantages th permit worthwhile savings in some our regular commercial items. We su pect there are others — and we inte to find out.

"As never before, the need for eve manufacturer is to reduce productio costs while maintaining or even impro ing quality of finished equipment Martin added. "This is an importa step in that direction."



■ ***Compactness of complete brazing installation at United Shoe Machinery is illustrated here. Entire brazing cycle, from precleaning to final rinsing, takes about 22 minutes.***

■ ***Substantial economies are realized when dip brazed aluminum feed rail (bottom) replaces steel unit with its machining, drilling and tapping operations, and its fasteners.***

PMD . . . and the Direct Chill casting method

OR CONTROLLED CASTING OF NON-FERROUS BILLETS

he direct chill method of casting has practically eliminated l of the objectionable defects that are present in most static astings. Because of the controls available to vary the casting onditions, billets cast by this method are particularly sound nd free from segregation, porosity, and inclusions. Grain size nd structure can be controlled or varied for different appli- ations.

irect chill casting is accomplished by pouring molten metal to an open end, water cooled mold that is closed at the ottom by a movable block. As the metal solidifies sufficiently form a skin, the bottom block is lowered at a controlled ate and the direct chill casting is in process. A wide variety shapes and forms is possible to cast in bar lengths replac- g individual castings, resulting in considerable savings in achining and fewer rejects because of casting flaws.

ermanent Mold Die Company is a pioneer in the direct chill asting process. Through the research facilities of PMD, better asting methods are constantly being devised . . . methods hat insure higher quality castings at lower costs. And remem- er, a Permanent Mold Die Co. engineer is available to anyone aving die casting or tooling problems.

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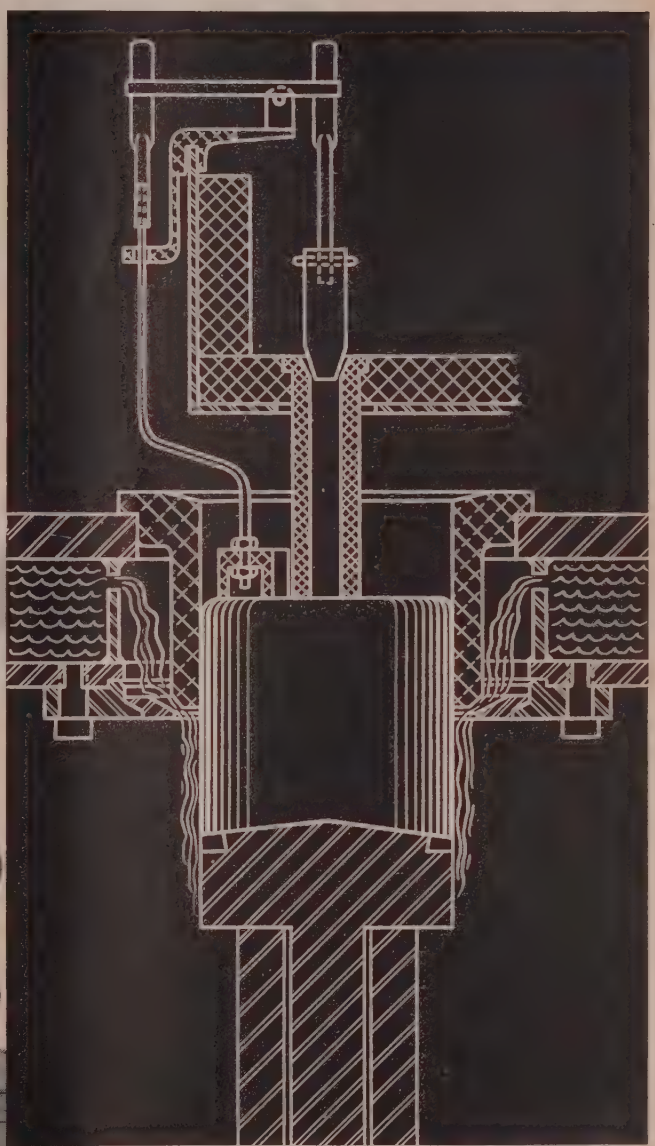

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News Products and People

New Boxcars Have Radically Improved Aluminum Doors

The Southern Railroad's recent order for 200 box cars is further evidence of its faith in aluminum as a construction material. Last year it ordered some 1200 hopper and gondola cars which were built almost entirely of aluminum (MM, July, '60). The new order is for cars that are equipped with aluminum doors of unique design.

The full-door cars now being built employ a mass production design adapted by Pullman-Standard Div'n and The Southern from Southern's prototype. Either side of the car can be opened to its full 50-foot, 6 inch length, permitting flat car loading convenience combined with boxcar protection.

Three aluminum doors on each side open in much the same manner as an overhead garage door. Two aluminum door posts, mounted on tracks on each side of the car, afford structural strength while in position, yet can be moved quickly to the end of the car to clear the doorway during loading.

"Selection of aluminum for this application enables the road to offer about 6000 pounds of increased capacity over a similar car with steel doors," said J. A. Burt, manager of railroad sales of Aluminum Co. of America. Alcoa reported the sale of over 800,000 pounds of its sheet and extrusions for use on this order.

The cars are being produced at Pullman-Standard's Bessemer, Ala., shops. Barber-Colman, Rockford, Ill., is fabricating the aluminum Wide-Span doors. The roll-up door sections are composed of hinged aluminum extrusions which fit under the roof when raised. When closed, the doors provide normal boxcar side strength.

Coatings Claimed to Stick Tight to Untreated Metal

A line of acrylic-based finish coatings that are said to exhibit excellent adhesion to aluminum that has received no pretreatment other than solvent cleaning has been developed by Universal Paint & Varnish, Inc., Bedford, Ohio. Tradenamed UNI-CLAD, the coatings are of the single-package, heat converting type, and are produced in clear or pigmented forms. Textures range from high gloss to burnish-proof matte.

Quickly and easily applied by dip, spray, electrostatic spray or electrostatic disc, Uni-Clad coatings require a baking schedule of 20 to 30 minutes at 350°F. Solvents required for reduction and clean-up are the readily-available and inexpensive aromatic, types such as toluol and xylol.

"Due to its high solids by volume, Uni-Clad is not much more expensive than conventional coatings," said a spokesman for Universal. "In fact, it is much lower in cost than most of the advanced coatings on the market today."

A technical bulletin prepared by Universal reports that Uni-Clad "performs very well over anodic, conversion coated or chemically treated aluminum, but protection on simply cleaned aluminum is so great that the use of primers or more costly treatments rarely would be required. Uni-Clad is being used in clear and tints instead of plain and color anodizing, with an addition plus of permitting high polish an gloss."

Universal has also brought out modified acrylic clear metal coatin which can either be air dried or bake (20 minutes at 300°F) for increase coating hardness. It is said to retai the characteristic clarity and wate whiteness of the acrylics, and exhib excellent retention of color whe tinted.

Applied by dip or spray, this form tion is touted as a replacement fo anodizing in many types of applic tions.

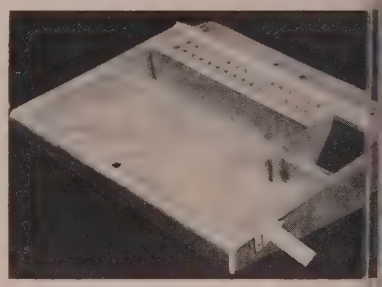
Aluminum Strip Conductor Has Pre-Contoured Edges

Aluminum coil strip conductor wi smooth, pre-contoured edges now commercially available says Harold W Adams, electrical conductor produc director, Reynolds Metals Co., Ric mond, Va.

"Engineers at the Reynolds McCoo Ill., plant have developed manufa turing techniques for producing c strip in .016 to .051 inch thickness with edges mechanically condition to have smoothly rounded corner says Adams.

"This process eliminates burrs al other irregularities that may exist the edges of ordinary slit strip whi may interfere with compact windi of electromagnetic coils and dama insulating media.

"The development is expected open new markets for aluminum su conductors with adherent organic fi insulations. In addition it will g electrical manufacturers now usi interleaved insulation higher standa of quality without changing their p duction procedures," he claims.



Self-Tapping Inserts Prevent Thread Stripping

Like most telephone switchbo shelves, Western Electric's new alu num model is frequently disassemb and re-assembled for maintenance o to add new lines. To prevent thr stripping or metal seizing caused b repeated fastening in the soft met Western Electric uses Tap-Lok s tapping inserts, made by Groov-in Corp., 1125 Hendricks Causeway, Ri

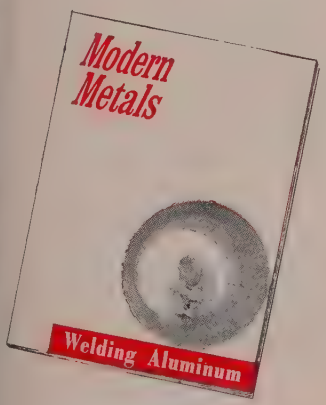
HAVING TROUBLE JOINING ALUMINUM?

Get the Solutions in These Informative Shop Manuals

FASTENING

—48 pages—If you're having trouble fastening aluminum, it's likely you'll find the answers in this reprint of Modern Metals' five-part series. The following methods and areas are covered in detail:

Comparison of Joining Methods
Choosing, Treating Fastener Alloys
Riveting Aluminum — Stitching Aluminum
Standard Threaded Fasteners
Holes: How to Make Them
Sheet Metal Screws
Special Rivets, Screws, Bolts, Locknuts
Studs, Washers, Inserts, Pins, Retaining Rings



WELDING

—52 pages—Equipment, procedures, techniques and technical data needed to produce quality welds on aluminum alloys are covered in these sections:

Tungsten-Inert-Gas Welding
Metal-Inert-Gas Welding
Comparison: MIG vs. TIG
Resistance Welding
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9/61

field, N.J., to attach telephone apparatus to the die cast shelf.

Threads aren't tapped directly into the casting because the aluminum shelf does not have the required thread wear resistance or strength. As a result, when Western Electric designed the new switchboard, it included inserts to provide strong threads and prevent thread wear and stripping in the soft metal casting (arrow in photo, p. 78).

Being self-tapping, the Tap-Lok inserts eliminated the need to tap holes prior to insertion. By using the standard insertion tool on a drill press, Western Electric fastens the inserts into holes which have been drilled to predetermined sizes.

Western Electric uses 26 steel cadmium plated Tap-Lok inserts in each shelf, twenty-two 6-32 inserts on the top, four 8-32 inserts on the bottom.

Extruded Frames Support Leisure Enclosures

A line of low cost aluminum frame enclosures for patios, year-round swimming pools, breezeways, porches, carports, greenhouses, vacation cabins and other shelters has been introduced by Weather-Wize Enclosure Corp., 8210 Joyce Drive, Louisville 19, Ky.

The firm already has erected a number of the enclosures, which are being marketed under the brand name "Shelter-All." One Louisville family has enclosed the entire back yard and made it a year-round tropical garden.

The closures consist of a framework of aluminum extrusions with fiberglass screens and optional in-fill panels of glass, fiberglass or film plastic.

A combination snap-in spline and weather-stripping system provides a weather-tight, insect-tight structure. Roofing may be of corrugated aluminum, fiberglass or screen.

Heart of the system is a double spline, grooved, heavy gauge aluminum extrusion developed by Weather-Wize with assistance from Reynolds Metals Co. The double spline permits removal of panels without removing screens. Aluminum I-beams are used for the roof structure; alloy is 6063-T6.

The enclosures can be equipped with doors and locks, built-in lighting, electrical outlets, ventilating fans and other extras.

Systems can be purchased on a completely installed basis or in preassembled sections for do-it-yourself erection. Foundations are conventionally poured concrete; frames can either be attached to the side of an existing building or erected free-standing. Most enclosures are put up in two days.

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...POCKET EXTRA PROFITS!

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LOOK AT THESE PROFIT-MAKING ADVANTAGES:

- Notch both ends automatically; automatic cut-off cuts pre-determined lengths.
- Reduce space requirements . . . stock all colors — in coils.
- Eliminate delivery delays — unnecessary freight costs.
- Nail holes and weep holes punched automatically.

*Basic design protected U.S. Pat. 2,942,506. Other pats. applied for

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Bright Dip Additive Cuts Fumes, Drag-Out, Pitting

An additive formulated to red processing difficulties inherent in alu num bright dips, and which is said drastically lessen fuming, drag-out, ting and streaking while substanti improving color and brightness, been developed by Alchemize Co 625 S. Kolmar Ave., Chicago 24, Il

Alchemize says its Additive LS'N s twice its cost and is suitable for any the phosphoric acid based dips. Only by volume is required, and it is c pletely stable at all concentrations temperatures.

The firm says LS'N can be used finishing aluminum automotive pa aircraft components, appliances, h ware, etc.

New Plate Saw On Job At Kaiser Sheet Plant

After an intial "breaking-in" pe a circular sawing machine for alumin alloy plates is now in full produc at Kaiser Aluminum & Chemical Co Ravenswood, W. Va. works. Wit capacity to handle material up to 6 long x 14 ft. wide x 6 in. thick, saw is believed to be the world's lar installation for trimming and subd ing light alloy plates. Its operatio closely related to that of an adja plate stretcher.

The entire sawing facility was signed and built by Loma Mac Manufacturing Co., Inc. of New Y in close cooperation with Kaiser's vanced Engineering Design Section, der the direction of A. Dean Smit comprises a 64 ft. travel rip saw, ft. travel cross cut saw and a 1 travel end trim saw, all integrate facilitate simultaneous operations.

The highly automated plate hand equipment comprises a charging for entering the stock into the rip a delivery table for removing the s from the rip saw into the cross c end trim saws, and a runout table discharging the finished plates. In o ation, each plate is loaded by crane the charging table. Plate is moved

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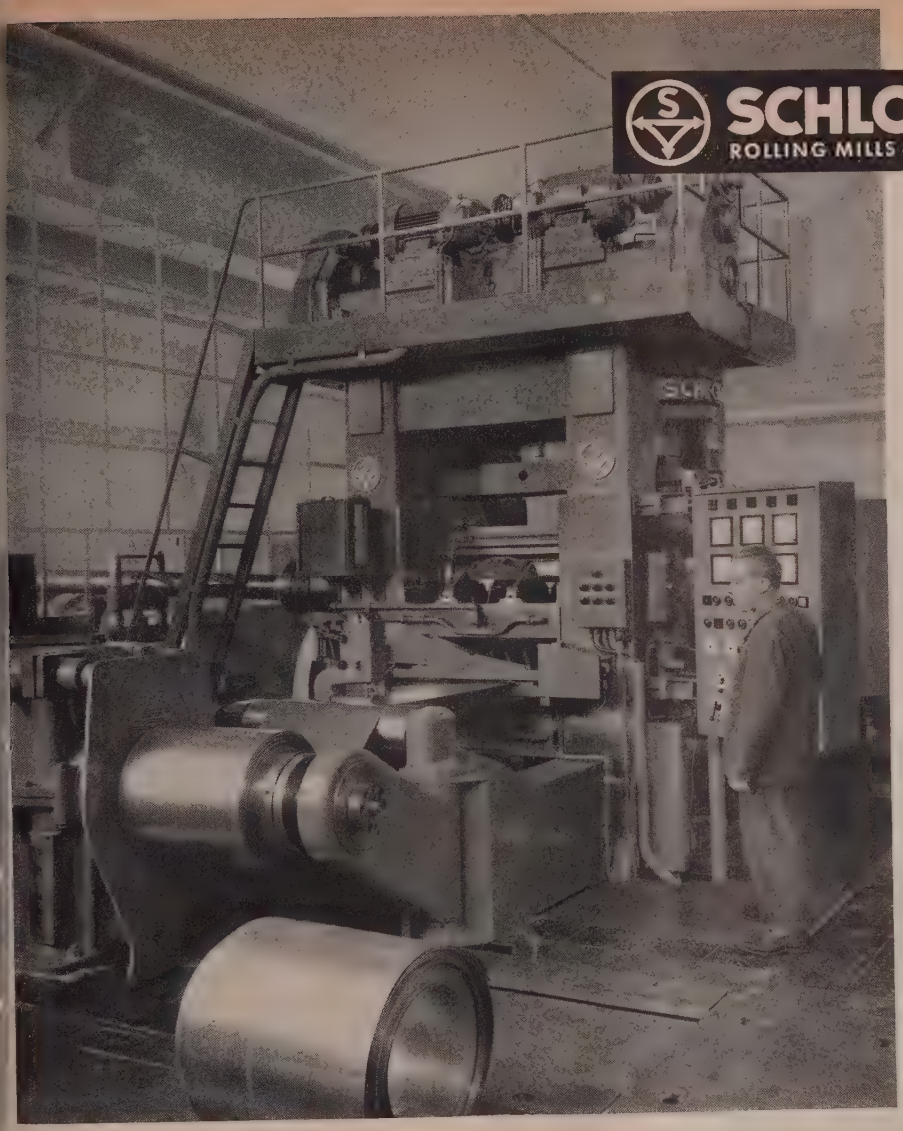
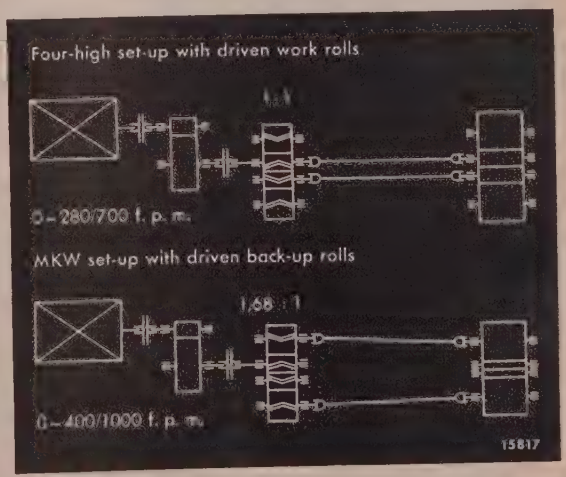


MKW cold rolling mill for 25 in. wide strip

MKW Rolling Mills
High Production, Ready Adaptability

SCHLOEMANN-designed mills for cold rolling narrow and medium strip are equipped for multi-purpose application with a two-high set-up for roughing and an MKW set-up featuring unilaterally supported work rolls in conjunction with driven back-ups for finish-rolling. A four-high set-up with driven work rolls can be used for roughing wide strip. This means that the diameter of the work rolls can be selected to best suit the particular rolling program.



FELLER ENGINEERING COMPANY 1165 Empire Building, Pittsburgh 22, Pa.

rip saw path by an automatic pusher drive which cuts out as soon as a series of stops on the delivery table are hit. At this instant the air-operated hold-down clamps located on both sides of the saw path are lowered, the length stops in the table disappear, the air-oil mist lubrication system is turned on, and the rip saw begins to make its cut.

The rip saw employs a 30-in. diameter carbide-tipped sawblade driven by a 60-h.p. motor at a peripheral speed of 12,000 ft. per minute. Feed rates of 5 to 45 ft. per minute are available during the cutting cycle, and there also is a 200 ft. per minute rapid return rate. The cross cut and end trim saws are all similarly designed except that their length of cut is only 14 ft.

Once the rip saw cut has been completed, the hold-down clamps open and the cut plate is moved out of the saw path by a set of belt conveyors. Subsequently, it is transferred by means of the reversible delivery table rollers, to be similarly cut by the cross cut and/or the end trim saws. Finally, the plate is moved onto the runout table, which is equipped with driven transfer rollers. It is now ready for crane pickup, to be transferred to the shipping or heat treating bay.

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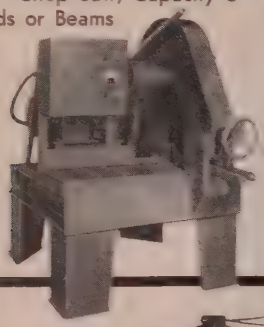
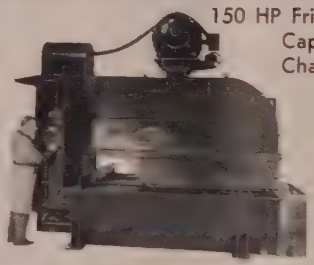


150 HP Friction Saw Capacity 24" Channel



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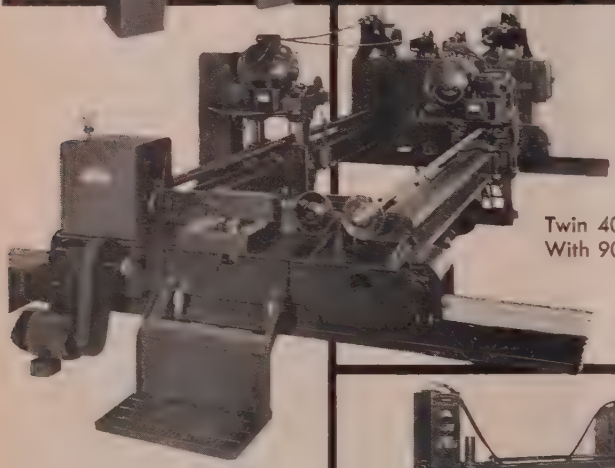

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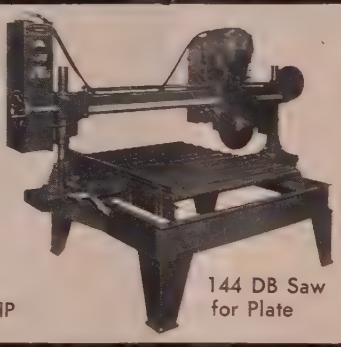

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A brochure pictures and describes the functions of many metal saws. If you have a cutting problem, write or call today.

New Gutter Cover Is Permanently Rustproof

Rain gutter covers that are rustpr inexpensive, inconspicuous and ea installed on half-round or box-t gutters are now available from Nic Wire & Aluminum Co., Davenp Iowa.

Called Gutter-Guard, the cover c sists of expanded aluminum m mounted on a strong aluminum ch nel. It is installed on top of the gu and snaps into place securely.

Gutter-Guard is easy to install may be cut to required lengths w common household shears. Seven inch lengths, 5 inches wide, come each consumer package, and there six packages per display carton. Nic new gutter cover is distributed thro hardware and building supply jobb coast to coast.

Mag Anodes Anodized For Water Heater Use

A new anodizing facility, said to p resent a major change in commer magnesium anode coating, is in full eration at Magnode Products Co., P Box 292, Trenton, Ohio.

Designed to coat magnesium w heater anodes, the facility utilizes patented HAE process licensed Western Sealant and Metal Finis Co.

This is said to be the first com cial installation in the country to uti the process for production quant and according to Frank M. Ruf Magnode treasurer, the first m change in magnesium anode coatin the last ten years.

Developed by H. A. Evangilides, h process is an anodic treatment for nesium which provides surface pr tion while preventing surface oxida Coatings in uniform thickness of

can be applied with specified areas
ntrolled bare metal exposure.
ode efficiency is significantly im-
ed by the new coating method, Ruf-
said, with the anode experiencing
er life and less destruction. Al-
gh designed basically for water
er anode coatings, the new semi-
matic anodizing line may be used
other product applications, he
d.

tish Aluminium Buys glish Magnesium Producer

itish Aluminium Co. Ltd. has pur-
ed a 40% interest in Magnesium
tron Ltd. held by The Distillers
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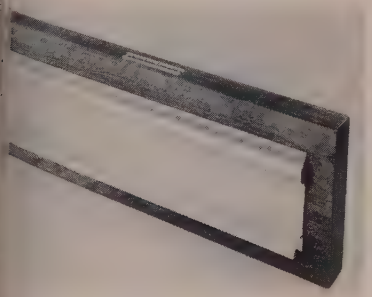
E L is now a wholly owned sub-
ary of British Aluminium which has
owned 60% of the outstanding
es. Major C. J. P. Ball, D.S.O., M.
who formed Magnesium Elektron
in 1936, will continue as chairman
he company.

E L is planning to construct a 5000
per annum primary magnesium
luction facility at Hopton, near
ksworth in Derbyshire. The plant
reduce local dolomite by a thermal
cess being successfully employed by
minion Magnesium Ltd. of Canada
Alabama Metallurgical Co. in the
A. The present M E L plant re-
es magnesium chloride salt by elec-
ysis but has found the process
conomical in light of a six-fold
ease in power cost since 1936.

he completion of the Hopton plant
make the U.K. largely independent
mports of magnesium. The dolomite
posits and the plant can be expanded
necessary.



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The M-D Mail Drop, in a fluted de-
n (shown above), comes in four ano-
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bras and Alblack (retail at $8.95). All
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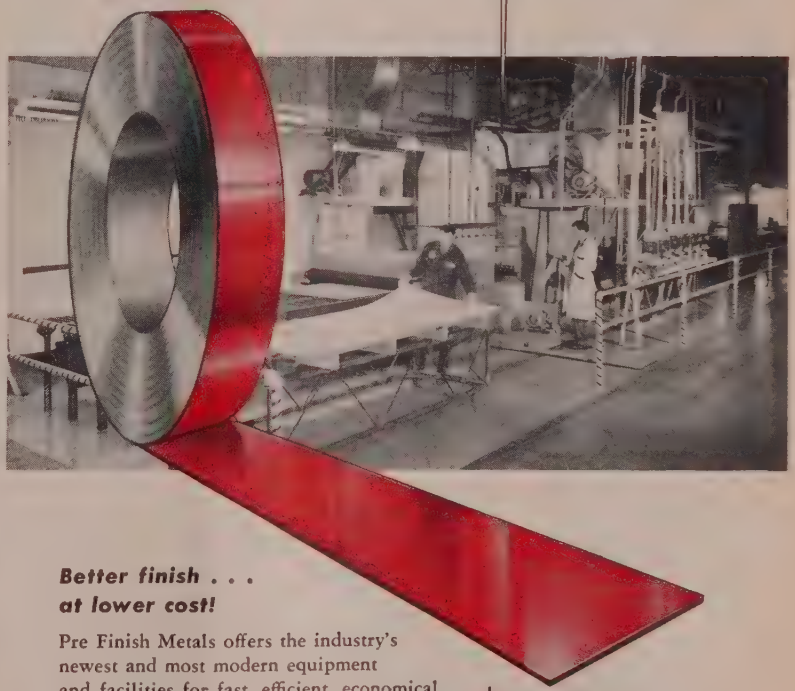

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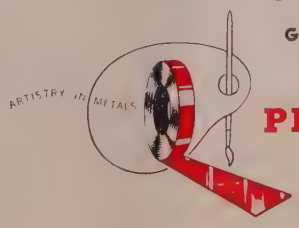

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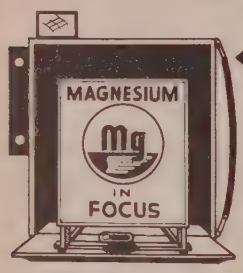
Aluminum Speedster After World Record

Sunrise over Saginaw Bay finds jet-powered *Miss Stars and Stripes II*, skimming the surface in final tests geared to season America's newest hydroplane for a shot at the world's water speed record.

The aluminum craft is owned by Detroit industrialist Robert Beverley Evans who co-designed it with builder Les Staudacher. Aluminum Company of America supplied more than two tons of aluminum and design-engineering assistance for the unique contender.

Evans plans to crack Donald Campbell's 260 mph. record. Staudacher recently exceeded 190 mph. in the craft, with "no strain."



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PLUS
AN EXHIBIT →

101 COMMERCIAL USES of MAGNESIUM

Thought you would like to know more about
The Magnesium Assn's 17th Annual Convention
October 16 · 17 · 18
Belmont Plaza Hotel
New York City

Just After
15th Annual Meeting & Space Flight Report American Rocket Society New York City, October 13-15

Just Before
National Metal Exposition American Society for Metals Detroit, October 23-27

TENTATIVE PROGRAM

Monday Morning
October 16

Weight as a Basic Factor in the Philosophy of "Brush Fire" Defense
FRANKLIN HUDDLE
Off of Spec Asst. Arms Control
DOD Washington D.C.

Magnesium-Lithium Alloys—A Progress Report of Current Developments
PAUL D. FROST
Battelle Memorial Institute Columbus Ohio

Fluoride Anodize as a Protective Process for Magnesium—A Laboratory Report
RAYMOND HAGSTROM
Raytheon Mfg Co. Maynard Mass

Dent Resistance of Magnesium Alloys Compared with Other Materials
J. A. GUSACK
D. E. RITZEMA
Dow Chemical Company, Midland Mich.

Monday Afternoon
October 16

Concurrent Meetings on Specific Topics

Design Considerations for Effective Use of Magnesium
Moderator D. A. BECK
Bendix Corp., Southfield, Michigan

Developments and Directions in Magnesium Alloys
Moderator P. D. FROST
Battelle Memorial Institute Columbus Ohio

Wrought Products and Mechanical Processing
Moderator J. S. KIRKPATRICK
Brooks & Perkins Inc. Detroit Michigan

Precision Castings, Quality Controls and Tolerances
Moderator J. D. ROBINSON
Bendix Aviation Corp. South Bend, Indiana

Magnesium Surface Finishes and Protective Systems
Moderator PETER ZYLSTRA
American Metaseal Corp. Detroit Michigan

Tuesday Morning
October 17

Current Accomplishments and Indicated Progress in Adhesive Bonding of Magnesium
ROBERT MONROE
IBM, Owego, New York

A Case History of Magnesium Use in a Product Line by a Major Company, With Emphasis on Die Casting
A. E. SWANSON
Doehler Jarvis Division Batavia, N.Y.

Facilities Evaluation of Suppliers of Magnesium Components
E. E. MILLER Western Electric Co. Greensboro N.C.
W. BABINGTON Bell Telephone Labs., Murray Hill, N.J.
W. R. CLITHEROW Western Electric Co. Greensboro N.C.

Rolled Ring Forgings of Magnesium in Production and Application
BERNARD HURST
Taylor Pipe and Forge Works, Chicago Illinois

Tuesday Afternoon
October 17

Standards and Specifications—Guide to Mutual Understanding—A Panel Discussion
Moderator I. V. WILLIAMS Bell Labs., Murray Hill, N.J.

JOSEPH JAKOBOWSKI General Electric, Philadelphia, Pa.
The place "typicals" have in specifications; the use of specification in selecting materials to meet specific design requirements

WILLIAM FREEMAN Lycoming Stratford Conn.
The problems inherent in recognition of stressed and non stressed a[illegible] standards importance of complete unders[illegible]g of such requirements by suppliers

WILLIS GROTH George C. Marshall Space Flight Center Huntsville Ala.
When specific customer standards of specifications are necessary, why general specifications will not serve

A. A. MOORE Dow Chemical Co. Midland Mich.
The need for data upon which to base good specs, the sources of production data their range and reasons for variations

K. E. NELSON Wellman Bronze & Aluminum Co., Bay City Mich.
The manner in which premium quality castings serve as an extension of specifications and open broader applications

LUDWIG HONOLD Honold Manufacturing Co. Folcroft, Pa.
How specifications and standards make mutual understanding by customer and supplier easier to reach

Wednesday Morning
October 18

Magnesium Forging Developments Provides Greater Economies and Wider Application Potential
STEVE IABLONSKI
Wyman Gordon, Worcester, Mass.

Novel Strengthening Processes for Light Alloy Forgings and Castings
JOHN F. BERRY
T. WATMOUGH
Armour Research Foundation

Chem Milling as a Fabricating Tool in Magnesium Applications
A. J. ILER
Norair, Hawthorne, California

Current Experience with Magnesium Protective Systems—A Research Report

For Final Program and Registration Information WRITE NOW

The Magnesium Assn., 122 E. 42nd St., New York 17, N. Y.

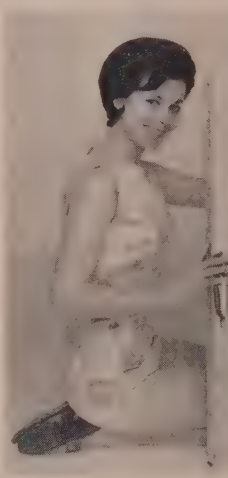
Aluminum Powder Used In Solid Rocket Fuel

U.S. rocket flights will burn up [illegible] million pounds of fine aluminum p[illegible]der annually by 1965 predicts Edw[illegible] F. Reilly, market manager, Reyn[illegible] Metals Co.

The atomized aluminum grains [illegible] finer than gun powder — are alre[illegible] providing extra zip for many of [illegible] nation's top rockets such as Pol[illegible] Pershing, Scout and Mace. Missiler[illegible] have found that by adding alumir[illegible] powder to solid fuel mixes they [illegible] greatly increase a propellant's th[illegible] because powdered aluminum rap[illegible] consumes oxygen when ignited, a[illegible] action that stimulates the entire [illegible] system.

"A technique has been perfect[illegible] said Reilly, "allowing Reynolds [illegible] make in quantity grains of alumi[illegible] ranging from 5 to 8 microns in [illegible] The smaller the grain the faster [illegible] more evenly it will burn. About 785[illegible] grains would easily fit on the hea[illegible] a tack."

Last year about 12,400,000 po[illegible] of powdered aluminum was prod[illegible] for all uses including paint, firew[illegible] abrasives, etc.



New Storm Door Faced With Stainless

The weather side of a new li[illegible] aluminum storm doors is being [illegible]ed with stainless steel. The pre-hung [illegible]ors in two models are being made by [illegible]ied Aluminum Products, Inc., 1800 W. [illegible]ulton St., Chicago.

The doors, measuring 32 x 80½ in[illegible]hes, 36 x 80 inches and other made-to-[illegible]der sizes, use Allegheny Ludlum's typ[illegible]430 stainless, 18 gauge. Claim is that [illegible]ied Aluminum is the first fabricator to [illegible]nar-ket an aluminum and stainless do[illegible]"at conventional storm door prices."

Allied Aluminum is also develo[illegible]ing a stainless steel facing for alum[illegible]um storm windows.

...gh-Temp Plasma Torch Cuts Metals 4-inches Thick

...metal cutting torch, utilizing the ...ciple of ultra-high temperature ...na, cuts aluminum, steel, stainless, ...er, cast iron or any other metal ... to four inches thick and thicker, ... Thermal Dynamics Corp., Leb... ..., N.H.

...ven metals such as tungsten, molyb... ...um, tantalum, etc. can be cut.

...sing argon, nitrogen and hydrogen ...tures, and operating with D-C pow... ...supplies, the plasma flame cutter, ... any standard cutting carriage or ...tograph so that the torch is centered ... the torch holder. Plasma velocities ...h over 10,000 miles per hour and ...peratures exceed 50,000°F.

...imple and accurate controls for gas ...tures, gas velocities and electric pow... ...supplies, the plasma flame cutter ...kness and for cutting speeds from ... inch to hundreds of inches per ...ute says the Firm. Typical speeds ... dross-free cutting mild steel, stain... ..., aluminum, etc. are 200 ipm.

...The water-cooled, gas sheath stabil... ...l torch produces a high power elec... ... arc which is contained within the ...ized plasma stream. The operator ...ts the torch with a remote control ...ton. No pre-heat time is required; ...l the high velocity of the plasma ...shes the molten metal from the kerf

region. The stop button instantly shuts off power, gases and traverse device.

Torch-to-work distance is not critical, replacement of parts is simple and inexpensive, and little operator training time is required, claims Thermal Dynamics. The control console provides gas and electric metering so procedures can be established and checked. The torch can be used for straight line or shape cutting.

Complete packages, including cutting torch, control console, remote control, gas controls and power supply, are available from Thermal Dynamics.

Small Silicon Rectifiers Are Economical, Versatile, Safe

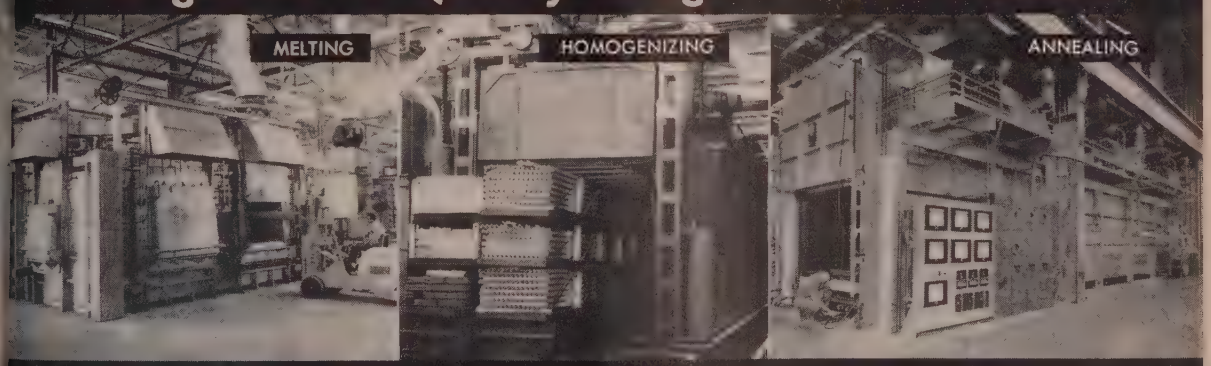
Small, economical, versatile and safe are some of the advantages claimed for the line of silicon rectifiers introduced recently by Allied Research Products Inc., 4004-06 E. Monument St., Baltimore 5, Md.

Although the cabinet size has been reduced by 45%, the new compact line matches standard sized rectifiers in performance, claims Allied. Over-size heat sinks and increased capacity of diodes reduce danger of over heating; an extra large fan draws air over the heat sinks and transformers and keeps ambient temperatures well below critical stage, says the firm.

Building block design of the new rectifiers allows use in either a vertical or horizontal position, and permits addition of extra capacity by stacking rectifiers on top of one another or placing them side by side. All Allied compact rectifiers have devices to protect against single phasing, excessive temperature, a-c or d-c overload. A special indicator shows exactly how much air is flowing through the rectifier and also indicates when to clean the air filter.

Units are available in capacities of 1000, 1500, 2000, 2500 and 3000 amperes with a wide choice of controls.

Recognized for Quality Design and Performance



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Extrusions Quenched With Air Water Vapor Mist

A method of quenching extruded aluminum that saves time and eliminates bulky equipment uses a high velocity stream of air water vapor mist directed on the extrusion as it leaves the die, explains American Machine & Metals Inc., 233 Broadway, New York 7.

The process supplants former methods, says the firm, some of which required costly long horizontal quenching tanks with running cold water or deep vertical wells in which the aluminum extrusions were immersed. It also eliminates self age hardening.

DeBothezat Fan Division of American Machine made the new technique possible by developing and patenting a special nozzle adapter for one of its fans. The device elongates the stream of air and fine water vapor mist from an overhead fan so that it plays on a lengthy area of the extrusion as it leaves the die.

The purpose of cold air-mist quenching is to change the molecular structure of the metal so as to give it a —T6 temper. This has a desirable quality for tensile strength, particularly in the 6061 and 6063 alloys.

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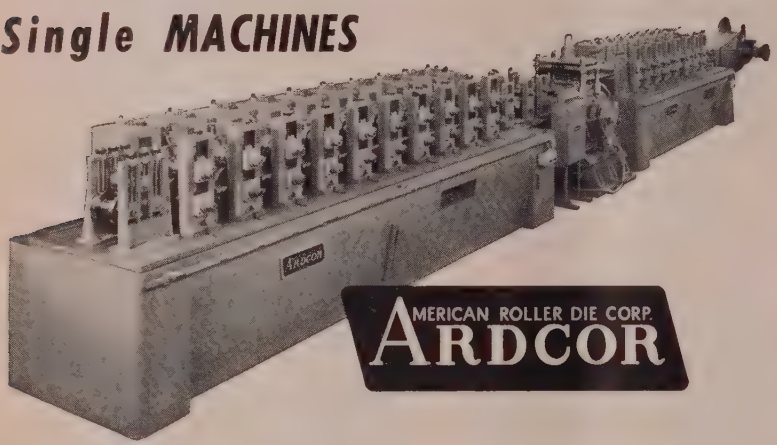

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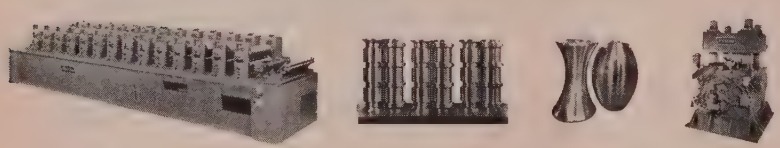

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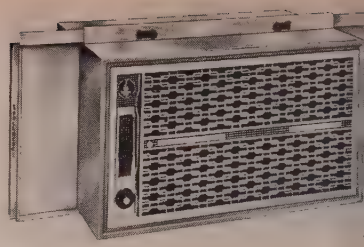
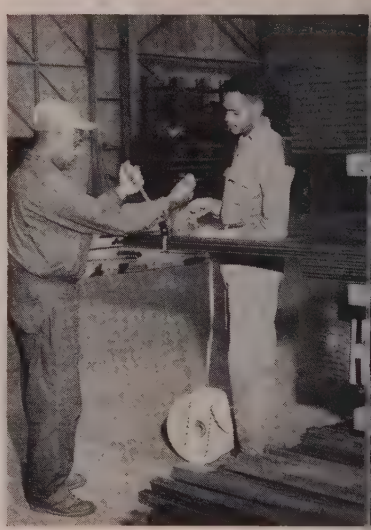


Extrusions Help Fit Room Air Conditioners

One of the features of Quiet Ko room air conditioners manufactured Emerson Radio is "true instant instal tion." Aluminum extrusions produc by General Extrusions, Inc., 4040 La Park Road, Youngstown, Ohio, are important part of this feature.

Instant installation of Quiet Kool conditioners is achieved with Ko Mount filled panels which pull out fit varying window widths. The tig fitting yet free-sliding frames for th panels are GEI shapes.

In addition to their utility the fra also are decorative. They come eith gold anodized to blend with color the air conditioning unit, or with mill finish.



Non-Metallic Strapping Spares Aluminum Shapes

Surface scratching, a major packagi problem in the shipment of aluminu has been solved by Glazer Steel Cor New Orleans metals warehouse, throu the use of the new rayon packagi material, Avistrap cord strapping.

The firm stocks and distributes co rolled tubing, aluminum, brass, copp and stainless steel. Shortly af Avistrap was put on the market in m 1960, Glazer Steel began using the hi strength rayon strapping in its Wa house No. 3, and found it easy

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handle and faster than other methods.

Glazer uses ½-inch Avistrap (Type 40) on 25-ft. lengths of aluminum channel and aluminum angle; six straps are used to package aluminum channel, and five straps have been found satisfactory for aluminum angle shipments. No corner protection or reinforcement of any kind is required — Avistrap is tightened directly around the aluminum.

The New Orleans distributor also uses Avistrap for shipments of 12-ft. lengths of aluminum rod and aluminum pipe. These lengths require just three rayon straps. For 20-ft. lengths of light wall tubing, five straps are used.

Copper tubing, brass rods, and cold rolled tubing are strapped with Avistrap, which is made and marketed by the Industrial Packaging Department of American Viscose Corp., 1617 Pennsylvania Blvd., Philadelphia 3.

Since it is of primary importance that most metals be guarded from scratching, if for no other reason than because of appearance upon delivery to customers, Glazer Steel has found in Avistrap a solution to its packaging problem. Furthermore, the firm points out that cold rolled shafting would not perform properly if it were scratched or marred in any way.

Specialists in small seamless aluminum tubing . . . competitive in price with first quality imports.

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ROCKVILLE, CONNECTICUT

Write for Complete Details

Multi-Color Vinyl Finishe Can be Sprayed on Meta

Multi-color, spray-on vinyl fin for a wide variety of consumer, a tectural, and industrial products a new product of Metal & The Corp., Rahway, N.J. In a two system, decorative vinyl finishes in limited color and with control texture can be applied to either minum or phosphated steel by cor tional or electrostatic spray techni

This new system permits applica of a tough, multi-color vinyl finis products after fabrication, produ savings over methods which start pre-laminated or pre-coated sheet m claims M&T. Since forming welding are done before the finish no special care is required in fab tion. And, the finish can be applie the fabricator's own shop with ventional equipment.

Cost-saving advantages claimed the M&T system: Inventory prob are greatly simplified, since only actual uncoated metal need be stoc different colors and textures are tained merely by changing the spray material; coated rejects can stripped and resprayed. Since pro tion scrap is generated prior to coa no vinyl material is lost and scrap full value.

In application, a wet film base of the desired undertone color is d oped with three or four spray p on the part to be coated. Immedi following this, and while the pa still wet, three or four passes of top are applied.

Color texture begins to form al immediately on this second applica and continues to form during specified 15- to 30-minute flash period. The normal bake schedule for five minutes at 200-250°F, follo by 15 minutes at 300-325°F.

...a Brings Out ...nomy Specular Sheet

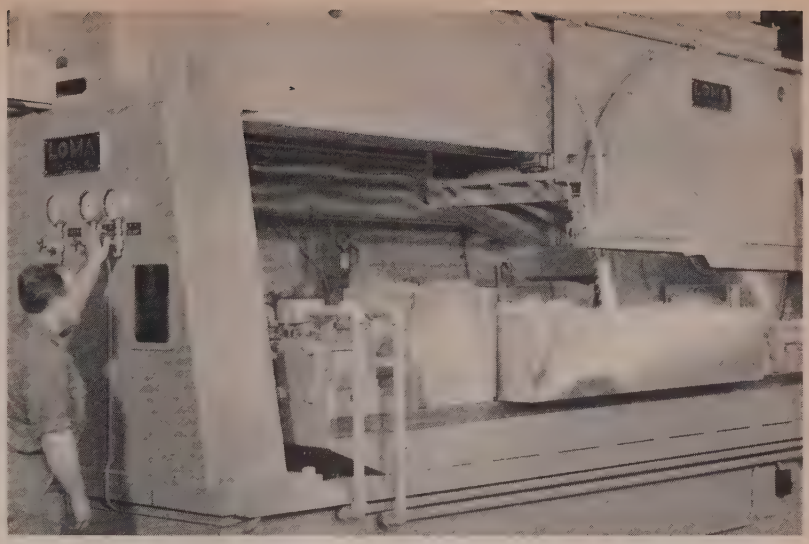
new aluminum alloy, 3002, has developed by Aluminum Co. of ica, in response to increasing de- for a lower-cost specular lighting tor material.

signed to provide maximum form- y, 3002 alloy is non-clad alumi- available in sheet circle form. n finished by the Alcoa Alzak (an registered trade-mark) process, sheet displays the same reflecting cteristics long associated with the process.

e of the new reflector sheet elim- s a pitfall in the use of clad sheet, e buffing sometimes removes the ling of unusually contoured re- rs.

ne alloy also displays excellent re- se to etchants normally used to ob- diffusing surfaces, and permits a n slightly brighter and less matte that obtained with No. 31 reflec- heet.

fered in circles up to 60 inches in eter, the new Alcoa reflector sheet vailable in the —0 and —H25 tem- in mill finish. In the —0 temper, provides formability comparable lo. 12 reflector sheet circles in this per. The —H25 temper is recom- ded for applications involving lim- forming.



Saw Cuts 3-Foot Diameter Billets; 80-Inch Wide Slabs

Aluminum alloy billets and slabs up to the largest sizes produced can be cut faster, with closer length tolerances and with smoother surfaces by using a new automated cold sawing installation by Loma Machine Mfg. Co., Inc., New York 16, N.Y.

The equipment centers around a large, hydraulically operated high-speed circular saw designed to cut billets up to 36 inches in diameter and slabs up to 20 inches thick by 80 inches wide. The machine can be equipped with up to 100 inch diameter blades. It is driven by a 200 h.p. two-speed motor to operate at 3000 or 6000 ft. per min. cutting speeds.

The machine has an overhead sliding carriage design, resulting in all essential moving parts of the equipment being located above the saw table. Consequently, the saw carriage with

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DOMINION MAGNESIUM LIMITED
320 Bay Street, Toronto, Canada

the arbor, gears, belt drive and motor remain entirely free from saw chips and coolant fluid.

The heavy overhead beam of the saw is supported by uprights mounted on the welded base of the machine. The beam comprises ground surfaces matching with adjustable bronze shoes on the carriage. The entire gear train is supported on adjustable tapered roller bearings assuring vibration-free rotation of the blade.

The saw is equipped with oil-hydraulic feed providing cutting rates infinitely adjustable up to 2 inches per sec. and return rates up to 3 inches per sec. The stroke of the saw carriage can be adjusted in both directions by means of cam-operated limit switches. The unit is equipped with two horizontal stock clamping systems, having both the front and rear jaws actuated by individual hydraulic cylinders.

The saw is virtually jam-proof. Any slow-down of the sawblade drive by as little as 10%, due to overload as may be caused by a dull blade, results in an automatic withdrawal of the saw carriage, without the main motor stopping or the stock clamps opening. This feature eliminates sawblade breakage due to any type of overload.

Aluminum Railing Rims Spiral Pedestrian Bridge

A pedestrian bridge with unique spiral approaches has been specifically designed by the Iowa State Highway Department for heavy student traffic over route 218 on the University of Iowa campus at Iowa City, Iowa.

The rectangular aluminum railing was specially fabricated by Howe Engineering Co., 5800 Massachusetts Ave., Indianapolis for R. J. Vickery, general contractors in Iowa City.

With the highway running closely parallel to the Iowa River, the circular approach was used to permit placing the bridge in the most strategic location. The 8-foot wide spiral approaches to the 350-foot long bridge measure 21 feet in outside diameter. The concrete floor hung on center pylon posts actually extends over the river.

National Distillers, Cerro in Primary Aluminum Study

Cerro Corp. and Bridgeport Brass Co. Division of National Distillers and Chemical Corp. are studying jointly the feasibility of an aluminum reduction plant of 56,000 tons annual capacity at Wauna, Ore.

A final decision will be made on completion of the feasibility study and on arrangement of satisfactory financing which would require approximately $50-million including initial working capital. The two companies would be equal partners in financing, building and operating the facility.

Cerro had revealed earlier that it was considering building a primary aluminum facility and that it had optioned a plant site near the mouth of the Columbia River at Wauna with deep water dock facilities. A 20-year contract has been signed between Cerro and the Bonneville Power Administration to supply 90,000 kw of electrical power for a projected aluminum reduction plant. Delivery would start by September 1. 1963.

Cerro has also made arrangements with AIAG Engineering Ltd., a subsidiary of Aluminium-Industrie-Aktien-Gesellschaft, a Swiss corporation, for technical assistance in design, construction and operation of the plant. The conventional aluminum electrolytic reduction process would be employed.

This would be National's second major expansion in the metals field this year; on June 30, it merged with Bridgeport Brass. Since 1960 it has owned a 60% interest in Reactive Metals, Inc., one of the largest integrated producers of special metals in this country and managed by Bridgeport Brass.

Both National Distillers and Cerro have metal fabricating units producing aluminum mill products. The Bridgeport Brass Co. Division fabricates a complete line of aluminum products such as rod, wire and sheet. Cerro's subsidiary, Fairmont Aluminum Co. and its United Pacific Aluminum Co. Division both produce aluminum sheet products.

Die Casting Lubricant Is Ashless, Non-Coking

"Ashless, non-coke forming, availab for either solvent or water dilutio equally effective for casting aluminu magnesium and zinc" — these are so of the claims being made for the cently developed die casting lubrica of Chem-Trend, 4880 U. S. 23, Brighto Mich.

Chem-Trend lubricants are not d persions but solutions of anti-we chemicals and lubricants that produ an opaque product. The firm says t opaqueness is caused by a viscosity-stab izing agent which also prevents cryst developments when the lubricants a stored at low temperatures.

The firm adds that the lubricants d not contain any silicones and since th clean very easily in most good alkali cleaners, plating problems sometim caused by the lubricant are eliminat completely.

Lubricants can be sprayed; a speci bodying agent prevents settling. C heavy jobs the lubricants are used full strength, but for light duty appli tions they can be diluted.

Forecast Collection Toys Are Big But Lightweight

The Forecast Fantasyland, a chil world of aluminum, has been creat by Martin Rosenzweig and Harold K sel for Aluminum Company of Ame ca's collection of outstanding desig for the future in aluminum.

The designers have taken the the of Forecast — "There's a world of a minum in the wonderful world of morrow" — and translated it into elves' garden of intriguing tactile, v ual, sound, and play experiences.

There are six elements of the Fanta land: alumophone, spectrum sundi tactile hopscotch, stepping stones, gia blocks and climbing rings (shown abov

The alumophone is an immense xy phone with gaily colored vertical sou ing bars. It consists of color-anodiz aluminum pipes mounted on small a

superior coil coatings

by DeSoto

open dramatic and

cost-saving opportunities

for use of pre-coated

materials in siding •

awnings • mobile homes •

roofing • curtain walls

DeSoto Chemical Coatings, Inc.

1350 S. Kostner Ave., Chicago 23, Ill.

minum bases, placed consecutively in straight, circular, or serpentine rows. It is "played" when a child runs by, striking successive pipes with a bar.

The sundial is a 6-foot-diameter aluminum disc, with 12 wedge-shaped segments in different porcelain enameled colors. For the child it is an understandable timing device — "Come home when the shadow gets to the red" — and an introduction to the sun as the determinant of time.

The climbing rings are assemblies of 2-foot-diameter aluminum rings, four high, in units of two or four vertical rows.

Tactile hopscotch is a sort of 3-D game employing panels of textured aluminum as the "field." The panels are either 2 by 2 or 2 by 4 feet in size, set in a resilient thiakol bed.

The Stepping Stones are a world of safely negotiable hills and valleys made of cast aluminum units, arrangeable at will. They are 4 feet in diameter, containing one-half of both a concave and a convex form, with longitudinal rubber insets to prevent sliding.

The giant blocks are 2-foot cubes, with faces variously colored and patterned. The hollow blocks are thin aluminum sheet, bonded to structurally rigid aluminum honeycomb, with a ber bumper molding along all e

Presently a consultant in graphic exhibition design, Rosenzweig served as art director of *Coronet* an *Industrial Design*.

Krisel is an architectural desi with Skidmore, Owings & Merrill.

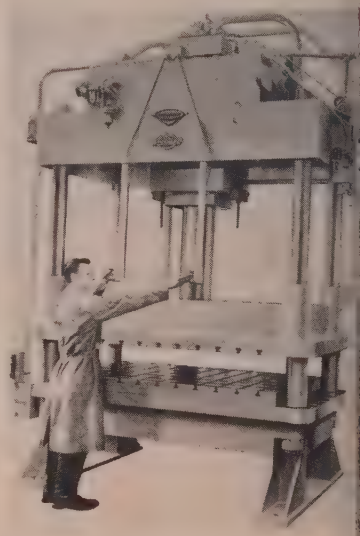
Stripper is Non-Corrosive To Magnesium, Aluminu

Epoxystrip NC-194 (noncorro stripping fluid quickly attacks and moves finishes without causing harm corrosive effects of the metal prod says Beck Equipment Co., 3350 137th St., Cleveland 11.

This stripper easily removes to modern finishes such as epoxies, p urethanes, and the new acrylics, as as conventional paints, lacquers enamels, according to Beck, without roding magnesium, aluminum, b steel or products using a combina of these metals.

Shortly after the stripper is app the treated finish swells, pops loose can be rinsed away with water. metal surface is left clean and pre-fi treatments intact. When dry the can be re-finished.

The stripping agent can be used prepare rejected parts for refinish or for removing paint from work h ers. The product can be used fro drum, in a dip tank, or on a cont ous production line.



100-Ton Trim Press Hydraulically Operated

A 4-bar trim press is equipped an adjustable deceleration valve is capable of exerting 100 tons of ming stroke pressure says B & Machinery Co., Holland, Mich., sion of Greenlee Bros. & Co.

This machine is designed to overc

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nitations of mechanically oper-
presses by utilizing hydraulic
les.
n speed production results from
proach velocity of 900 ipm and
rn speed of 875 ipm. The slow
ing action of 59 ipm produces
sheared, clean castings.
er features include a 36 inch by
h die area, a supporting 52 inch
inch base platen, safety stops on
bars, and a 30 inch stroke.

anded Metal Serves As hway Anti-Glare Screen

he depth of expanded aluminum
, installed along turnpike median
s, keeps auto glare from blinding
therwise interfering with the vision
notorists traveling in the opposite
tion. Called Glare Screen, the new
duct is a development of Aluminum
of America.
he new headlight barrier system
sists of a four-foot high fence of
expanded metal mesh which has
n found ideal for reducing the dan-
of nighttime glare on curves, or on
ght-away stretches with narrow
lian strips. It needs no painting
is thus virtually maintenance free.
nough it blocks direct headlight glare,
screen allows an almost unimpeded
on of the surrounding countryside,
en viewed at an angle of about 90
rees.
ohn N. Schumacher, in charge of this
product for Alcoa, said, "This
en design meets the urgent need
an inexpensive device to eliminate
dlight glare, a recognized cause of
idents. It has a life expectancy ex-
ding 40 years, and is easily erected
transported.
Its use in conjunction with proven
es of physical barriers should greatly
prove nighttime highway safety. With
new glare deflector system, it will

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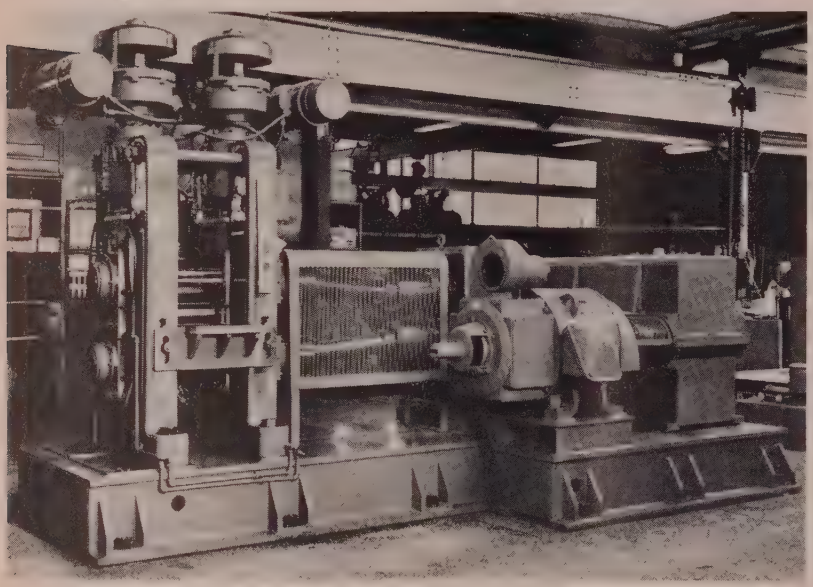
be possible for drivers to use their own headlight high beams without endangering motorists traveling in the opposite direction. This has the effect of increasing the driver's area of visibility by several hundred feet," he added.

Installations of the new Alcoa screen already have been made by several states. These are located on U. S. 130 near Hightstown, N. J.; along the Gary East Expressway (Interstate Route 35) in Oklahoma City, Okla.; and on U. S. 81, near Fort Worth, Tex. Other states, including California, New York and Michigan, also have authorized installations.



Combination Mill Handles Hot, Cold Reduction

One mill using interchangeable roll sets performs the functions of a 2-high hot breakdown mill, a 2-high cold intermediate mill, a 4-high cold finishing mill, and a 2-high rod rolling mill.

The mill was designed and built by Stanat Mfg. Co., Inc., 500 Shames Drive, Westbury, L. I., to process a wide variety of medium to super-strength alloys.

The new machine is a 14 inch wide, 2-high/4-high combination rolling mill which employs 3 inch diameter work rolls and 10 inch diameter back-up rolls as well as 12 inch diameter work rolls for 2-high, flat rolling. Moreover, the mill offers provision to extend the outboard housing to accommodate 12 inch diameter by 24 inch long grooved rolls for rod and other shape rolling.

Large, high tensile cast steel frames are capable of withstanding extreme work loads with minimum deflection, claims Stanat. Roll adjustment is provided by a highly refined remotely controlled motorized screwdown system with each screwdown equipped with its individual gear motor. The two gear motors are interconnected by means of an electro-magnetic clutch allowing simultaneous or independent operation of each screwdown.

The screwdown design employs the "moving screw" principle, offering constant maximum thread engagement within a bronze bushing in each roll frame. Screwdown gearing is fully enclosed in screwdown boxes which are bolted directly to roll frames.

Rolls run on heavy duty, bronze cage-type, high precision needle roller bearings. The bearings offer an average run-out of 0 to .0001 inch measured on the roll journal running in the bearing under load. Axial location of rolls is held by preloaded thrust bearings, offering precise alignment and elimination of all axial movement, particularly desirable with grooved rolls.

Roll neck bearings are lubricated by means of a closed circuit lubricating, circulating cooling and filtering system.

Roll drive is through heavy-duty gear type spindles from a totally enclosed pinion stand. The pinion stand houses heavy-duty, continuous tooth herringbone gears mounted on spherical roller bearings.

A sturdy steel base weldment assembly with a built-in oil reservoir supports the roll housings, pinion stand, reduction gearing and motor. The roll housings and pinion stand bases are keyed for maintaining accurate alignment offering a factory pre-aligned package, avoiding the necessity of aligning the drive to the mill at installation. Leveling of the unit is simplified by means of special hollow leveling screws in the base flange of the machine permitting anchor bolts to tie the mill to floor.

The mill has compression load cells which measure rolling loads, emergency safety bars, a drive spindle support facilitate roll changeover and quick lease, snap-out type roll wipers.

A highly refined infinitely vari adjustable speed d-c drive system po the mill and offers rapid reversal, d able for hot rolling applications.

The mill can also be used in production processing lines, emplo either single direction or reversing sion winding equipment.

Extruded, Coated Electrod For All Position Welding

An aluminum electrode with an truded coating (AWS Grade AL for all-position welding, with di current reverse polarity, of alumi plate, sheet and castings is a new p uct of Air Reduction Sales Co., E. 42nd St., New York 17, N.Y.

The Airco 43 electrode oper smoothly with an easy-to-control, q arc, while providing a dense, low s ter deposit, describes Airco. This truded aluminum electrode prov low amperage application; easy removal; tensile strength yields up 28,000 psi.

Airco 43 is usable in flat, horizo and vertical arc welding positions w repairing cracks in building-up w parts, cladding and reinforcing. I ideal for welding tanks, railings, p and is also used in truck and auto tive construction and repair.

Airco 43 comes in two sizes, ⅛ diameter by 14 inches in length 5/32 inch diameter by 16 inches length; is shipped in five po packages.

Mag Containers Forged For NASA Satellite

Large magnesium containers, on which will hold the collapsed Nat Aeronautics and Space Administra passive communications satellite (A. 12) when it is shot into orbit year, are being forged by Wy Gordon Co., Worcester, Mass.

The containers are spheres mac hemispheres 40-inches in diameter 13 inches deep. Each sphere will

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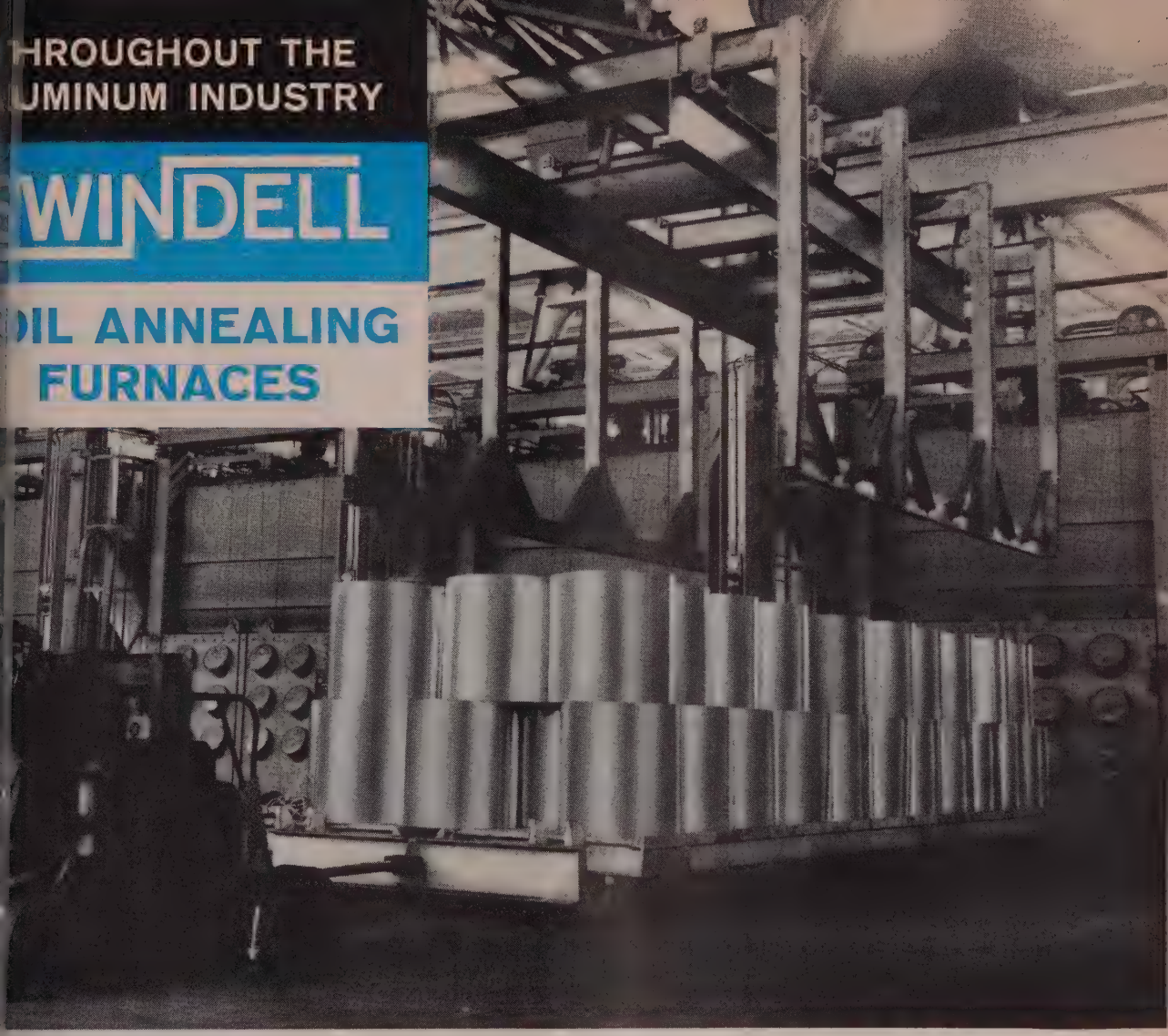

ıe engineering and construction of furnaces for annealing iled sheet aluminum is a Swindell-Dressler specialty—one at goes back to the early days of the industry. Representa-ve of the many large Swindell installations in this country e (above) a 125,000 lb capacity gas-fired radiant tube coil ınealing furnace, about to receive its load, and (below) the ımplete battery of 22 furnaces. If you have an aluminum ·ating requirement, discuss it *first* with Swindell-Dressler!

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an auxiliary ring forged separately, and its own attachments.

After fabrication, the containers will be packed with the deflated 135-foot, 500 pound satellite and instruments, and mounted on a Thor Agena-B booster. Once the container has been lofted into an orbital position, a ground command signal will open it and release the satellite, which will then inflate itself.

The satellite is made of .35-mil thick Mylar plastic laminated on both sides with a .2-mil thickness of aluminum foil. This lightweight satellite is expected to retain its shape indefinitely while in a 700 mile circular orbit.

Wyman-Gordon is forging the half containers at its North Grafton, Mass., plant on a 50,000 ton capacity closed die press.

New Unit Eases Parts Rinsing, Washing

A special contrivance for automatic agitation of products in a cleaning cycle is a new development of the Equipment Div'n of Magnus Chemical Co., Garwood, N. J. Called Porto Lif, the lever controlled, pneumatically operated unit is said to be designed for all multi-tank cleaning and provides 100 to 140 up-and-down motions per minute in the cleaning solution. When the unit is used, the work can be suspended, basketed, or platformed; the work is provided with the necessary dirt-shearing action to reach deep into all recesses of the parts for the most thorough cleaning obtainable.

Work to be cleaned is loaded on the platform of the Porto Lif at floor level, eliminating manual lifting or the use of overhead hoists. In operation, the work is loaded onto the platform, pneumatically raised and then manually rolled into position over the first tank.

"A flick of the lever lowers the platform into the tank of cleaning solution and automatically starts the agitation," Magnus explains. "At the end of the cleaning period, the platform is raised from the solution and the unit rolled into position over the next tank for an agitated rinse."

The unit shown is for two stages, wash and rinse. It can be adapted to perform any number of operations such as pre-wash, wash, rinse, anti-rust and dry. Porto Lif can be purchased to be used with existing tanks or as a complete unit including desired number of tanks. It can also be mounted on 30 and 55 gallon drums, Magnus says.

Japanese Firm Signs Fabrication Agreement With Dow

The Dow Chemical Co. will provide technical information on the fabrication of magnesium to Kobe Steel Works Ltd., Tokyo, Japan, under a 15-year exchange agreement just concluded between the two companies.

The information to be transferred to Kobe on a fee-plus-royalty basis covers magnesium casting (sand, permanent mold and die), rolling, extruding, sheet-metal work and surface finishing.

The agreement also establishes Kobe as the exclusive Japanese licensee of pertinent Dow magnesium fabrication patents.

Kobe has granted a sublicense to Asahi Chemical Industry Co. Ltd., Tokyo, and both companies shortly will send technicians to the U.S. for instruction in Dow magnesium fabrication know-how. Additional informat will be made available during the of the agreement. For its part, K and its sub-licensee will make availa to Dow information on new magnesi technological contributions pionee by them.

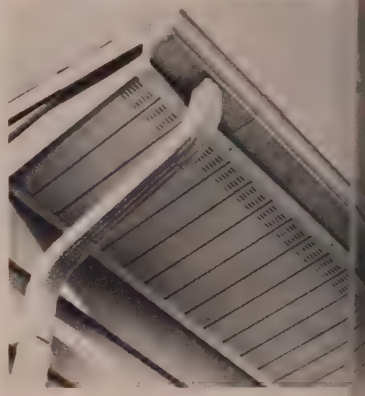
Kobe Steel Works now operates magnesium die-casting plant, sand fo dry and rolling and extruding facili Asahi Chemical Industry Co. prod primary magnesium and also maint a magnesium foundry. Both firms expected to increase their magnesi operations considerably as a result the information agreement.

Fulton Industries Buys Die Caster in East

The business and operating asset the Dollin Corp., Irvington, N. J., minum and zinc die caster, have b purchased by Fulton Industries I Atlanta-based diversified industrial ganization. Price was not disclosed

Dollin becomes a division of Preci Castings Co., one of Fulton's six ope ing divisions. Precision, the nati third largest producer of non-fer die castings, already has plants in Cl land and Fayetteville, N. Y.

Annual sales volume of Dollin is mated at $4 million; Fulton's vol last year amounted to more than million.

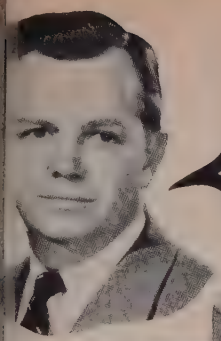


Ventilated Soffit Finishes Underside of Roof Overha

An all-aluminum soffit system d signed to economically and effec finish the underneath side of the overhang and give the home a trim appearance says Kaiser Alum & Chemical Sales, Inc., Oaklan Calif.

The ventilated soffit consists completely engineered snap-in s made from white pre-enameled embossed panels which span from to fascia. No nails are exposed a job site painting is required.

Air flow louvers are provided the outer edge of each soffit which allow efficient air flow thr



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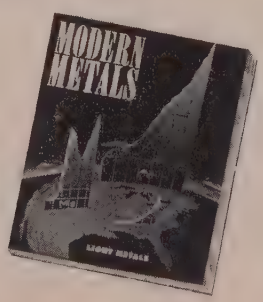

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out the under-eave area. The ventilated soffit panels provide for 3.03 square inches of net free ventilating area per lineal foot.

Panels are available in four-foot lengths and in 12, 16, and 24-inch widths to fit most standard soffit dimensions. Panels can be easily cut to fit other sizes. Accessories include wall moulding, core and snap-on moulding; all in 8-foot lengths. Miter moulding is available in 99-inch lengths; inside and outside corners complete the system.

The panels have inverted ribs at 3-inch intervals to provide both rigidity and attractiveness.

Dilute Zincate Solution Eases Aluminum Plating

A simplified method of plating aluminum using a dilute zincate solution has been developed by Enthone, Inc., 442 Elm St., New Haven 8, Conn., subsidiary of American Smelting & Refining Co.

The zincating bath, known as Alumon "D", is made up at a concentration of only 1 lb./gal. of Alumon "D" salts. Compared with the viscous 4 to 5 lb./gal. conventional zincate bath, it is easier to make up; is freer rinsing; penetrates more readily into grooves, blind holes, and screw threads; reduces dragout; and minimizes carryover of zincate into subsequent plating baths.

In laboratory tests on identical aluminum parts, the amount of solution dragged out of an Alumon "D" bath was less than 1/3 the amount dragged out of a conventional zincate solution; due to the lower concentration, the amount of dissolved salts lost through the dragout was less than 1/12 the amount lost from the conventional bath.

Used after cleaning and acid dipping, Alumon "D" simultaneously activates the aluminum and deposits a thin, dense, uniform zinc film. This film can then be electroplated with copper, nickel, or other deposits with excellent adhesion. Immersion times in the Alumon "D" vary from 15 seconds to 2 minutes at room temperature.

The dilute Alumon "D" solution has a viscosity very near that of water and rapidly penetrates the water film present on aluminum parts from the preceding rinse. This results in uniform treatment of the entire surface which is especially important on threaded parts, porous castings, and parts with blind holes and other configurations which trap water. Unlike Alumon "D", the concentrated zincate baths penetrate into these areas with difficulty, become diluted with the entrapped water, and attack the aluminum forming loosely adherent zinc films. Blistering inevitably results.

Alumon "D" is available as a powder or as a liquid concentrate; they may be used interchangeably.

Non-Destructive Test Unit Gauges Aluminum Coatings

A non-destructive testing device developed by Twin City Testing Corp., 533 S. Niagara St., Tonawanda, N. Y., is said to accurately gauge non-conductive coatings on aluminum alloys.

The instrument is being marketed as a Type EC Permascope; Alcoa has purchased 26 units for use in 20 of its plants and laboratories.

In addition to gauging non-conductive coatings on non-ferrous base metals, the Permascope offers a non-destructive means of measuring: Thickness of nonferrous metal on a nonferrous base; thickness of nonferrous coating on a non-conductor; conductivity of nonferrous metal.

The portable unit can be used wherever there is a 110 volt a-c outlet. It operates on the eddy current test principle, has a unique feature in that its electronic circuitry allows compensation for conductivity variations of the base metal which would otherwise produce erroneous readings.

With the measuring coil held in a spring-loaded housing, the probe is applied at light, uniform pressure to the test specimen. The axial position of the probe tip can be adjusted for measurements on curved surfaces, without recalibration.

Equipped with two direct-reading scales, the standard model has thickness measurement ranges of 0-0.001" and 0-0.005". A modified version is available with a thickness measurement range of either 0-0.001" or 0-0.005" plus a conductivity measurement range of 16-110% IACS.

Anodized aluminum plates and plastic foils in accurately determined thicknesses as well as a copper standard are furnished for calibrating the instrument. Slip-on adapters can be provided (optionally) for measurements on cylindrical surfaces and narrow strips.

Patio Made of Rolled Fascias, Interlocking Ro

An aluminum carport and patio of roll formed fascia sections and locking roof panels has been intro by Hindman Mfg. Co., P.O. Bo Centralia, Ill.

Marketed under the name Top," the system can be install home owners to required leng width. The roof, supported by mental aluminum posts or p steel columns, is designed to bea pound per square foot snow load. are available in baked on white minum painted finishes with a of 15 stripe colors.

The one piece aluminum fascia designed with an integral drai gutter system, has a double flang for fastening roof panels at two Ribbed fascia plates are availa 6¼-inch and 8-inch face front

Roof panels formed with fl shaped ribs, 2½ inches deep, are 10 inches wide. Tight interl seams located on top of the V assure a leak proof roof system aluminum roof panels are availa thicknesses from .020 to .040 inche

The Flat-Top marquee can b structed with the same materia stores, drive-in restaurant bays,

Kitimat Repairs Comple Two Potlines Started

Two potlines at Aluminum Canada Ltd.'s Kitimat, B. C., have been re-activated, followi completion of repairs and rock moval in the 10-mile water house tunnel.

The plant was shut down months ago so that $2 million pairs could be made. During th down Kitimat continued makin ments by tapping its inventory.

Plant officials say that 96% of hundred workers called back t jobs have reported.

Kitimat is powered by the 1 hp Kemano hydroelectric plant. capacity is 192,000 tons. The has five potlines, four and one which will be re-activated.

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ooking Ahead

: of aluminum smelters ingot should remain stable through the fall and winter. Scrap supply is plentiful, and aluminum casting volume is on the increase. The auto industry, biggest single market for aluminum castings, is expected to peddle up to 7 million cars in the 1962 model year. Appliance industry, another sizeable market, is shaking off the effects of the slump; may well find its 1961 sales volume topping the $4.3 billion spent last year for major household appliances.

ent dispute over prices of smelters alloys is not quite as serious as it sounds. Late last month Apex Smelting chopped half a cent off the price of all but two types of alloys. Other smelters refused to go along with the reductions; insisted that business was picking up and that an increase would be more realistic. But Apex asserted that its action would only "make official" the behind-the-scenes price cutting that had become general practice. About a week later, Alloys & Chemicals Corp. announced a 2-cent cut in the price of D132 (piston) alloy, and a 2¼-cent reduction for No. 218 alloy ingots. This was interpreted as a retaliatory move, aimed at forcing Apex to reverse its action. As of this writing, Apex has neither rescinded its price cuts, nor followed the A & C reductions.

ning up of aluminum sheet prices gained momentum when Olin Mathieson eliminated building sheet from its product roster and replaced it with alloy 3105 sheet, priced 2 to 3 cents a pound higher than the old building sheet prices. Olin also hiked the price of residential siding sheet to 41.5 cents a pound (.024-inch thick, in widths from 6 to 11.99 inches). Olin's action followed similar moves by the other producers.

minum industry could have avoided the woes following the introduction of building sheet if it has heeded the lessons learned by the steel industry, according to Logan Johnston, president of Armco Steel. Apparently, steel producers flirted with similar commodity pricing "several years ago," and got burned.

e primary aluminum club may have to make room for new members in a couple of years. Of the several companies that are thinking of applying for membership in this once-exclusive group, Cerro Corp. and National Distillers seem to be the closest to actually taking the plunge. (Details of their proposed joint venture are reported on page 90.) Latest known entry in the primary aluminum sweepstakes is Consolidated Aluminum Co., producer of super-purity aluminum, as well as sheet and foil. Consolidated is reported to be eyeing a tract of land near New Johnsonville, Tenn. as a possible site for a $27 million aluminum plant. The company's present plant is at Jackson, Tenn. Another prospective newcomer is Howe Sound Co. Early this year, Howe Sound revealed its intentions to construct a primary aluminum smelter which reportedly would cost $45 million and employ some 350 people. Howe Sound is said to have narrowed its choice of plant location down to Calvert City, Ky., Decatur, Ala., or New Johnsonville, Tenn. Enthusiastic industrial development boards throughout the south are grinding out hopeful rumors regarding other aluminum industry plans, but few of them sound serious.

Sales of metalworking equipment should reap some benefit from the expected upturn in plant construction and modernization late this year and throughout '62. Contract awards for new industrial plants next year will top the '61 level by a hefty 22%, according to McGraw-Hill's *Construction Daily*. Utilities and chemical processing plants will show the big gains, but others that will figure prominently in the overall increase include aircraft and missile makers, electronics companies, and other defense-related metalworking industries.

Rosy outlook for home building was voiced recently by Melvin H. Baker, chairman of National Gypsum, the big producer of building products. New housing starts will total about 1.3 million this year and hold at about that level until 1965, Baker predicted. At that time, "the basic annual demand will rise to around 1.7 million new homes a year, and this should move up to 2 million a year by 1970," Baker said. He also sees total outlays for construction hitting $80 billion annually by 1971. On the basis of this outlook, National Gypsum plans to invest a quarter of a billion dollars in new and expanded capacity in the next ten years.

Motels are a natural growth market for aluminum — particularly extrusions and sheet. Apparently, motel builders are running out of space in the country; are snapping up choice locations in the cities. Example: The Marriott Motor Hotel in Philadelphia. It's made of a new type of aluminum unit wall; contains some 57,000 pounds of extrusions. Designed by McKeon, Inc. with help from Reynolds Metals, this modular wall system uses 18 different shapes in framework and grid sections.

Threat of cut-rate imports of aluminum from Japan looks more remote than ever. Although output of primary and secondary ingot is pushing to new all-time highs over there, booming Japanese industry is gobbling up every pound of metal it can get. Foundries and fabricating plants are toppling production records with tedious regularity. It's been at least two years since Japan exported any significant amount of aluminum, and they've been buying substantial quantities from the U. S. and Canada.

—The Editors

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